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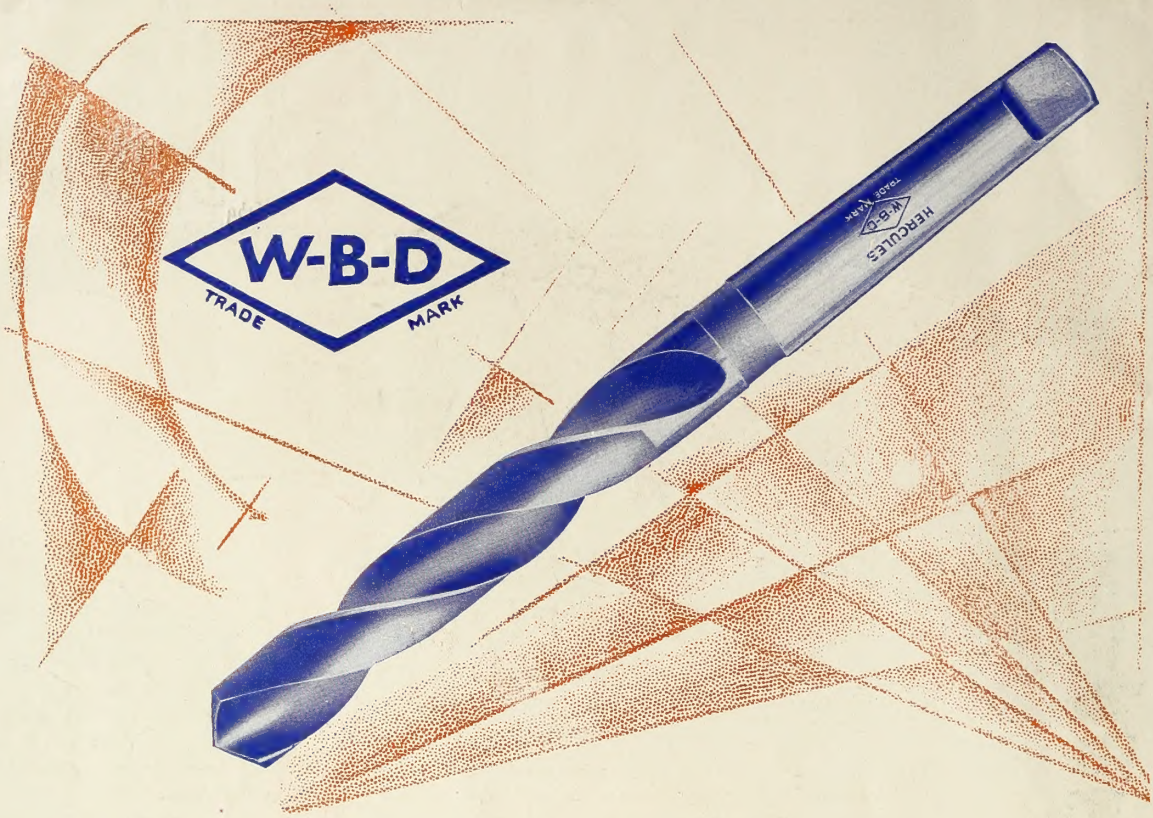
San Francisco, California
2014

OL. 13 No. 3 SEPTEMBER 1928 25 Cents

AERO DIGEST



National AIR RACES and show CALIFORNIA



Veterans in Service

Speed - Accuracy - Economy

You of the aeronautic industry know full well the vital necessity of accuracy, speed and economy in production.

With these factors of greater importance in your industry than in perhaps any other, it is almost unnecessary to point out that such tools as are used must be of the best.

Undoubtedly you are already familiar with the high standing of "Hercules" drills, reamers and cutters. You will find their lasting dependability a source of satisfaction and marked economy.

WHITMAN BARNES-
DETROIT CORPORATION

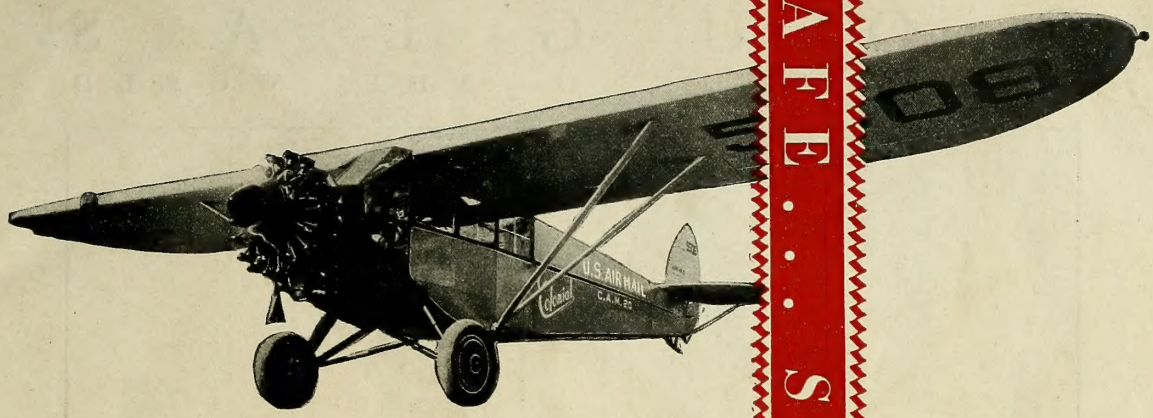
Manufacturers of
TWIST DRILLS · REAMERS · CUTTERS
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Canadian Factory
CANADIAN DETROIT TWIST DRILL
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New York · · · DETROIT · · · *Chicago*

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SAFE . . . SWIFT . . . S-M-O-O-T-H . . .



Maj. Gen. John F. O'Ryan, President of the Colonial Western Airways, Inc.

TRANSPORTATION . . . OPERATION

Is there a more exacting test of the capabilities of an airplane than the requirements demanded by regular —safe . . . swift . . . smooth . . . transport operation?

Carrying mail, express and passengers . . . in winter and in summer, in rain, in snow, in fog—over lakes, forests, rivers, and plains, day and night, month after month, maintaining an on-time schedule geared with the wheels of commerce and industry . . . requires an airplane of efficient design and reliable construction.

In fulfilling their appointed tasks, Fairchild Cabin Monoplanes are serving thirty transport operators—covering the continent of North America.★

That Fairchild Monoplanes have earned by proof of *past and present* performance the acknowledged regard of the organizations which employ them in their transport services is reflected by the commendation of Major General John F. O'Ryan, President of the Colonial Western Airways, Incorporated: "Safe . . . Swift . . . Smooth—my verdict on the Fairchild which carried me from Albany to Buffalo on the opening day of the Colonial Western Line. Congratulations to the manufacturer, Sherman M. Fairchild, President." Fairchild Airplane Manufacturing Corporation, 270 West Thirty-eighth Street, New York City.

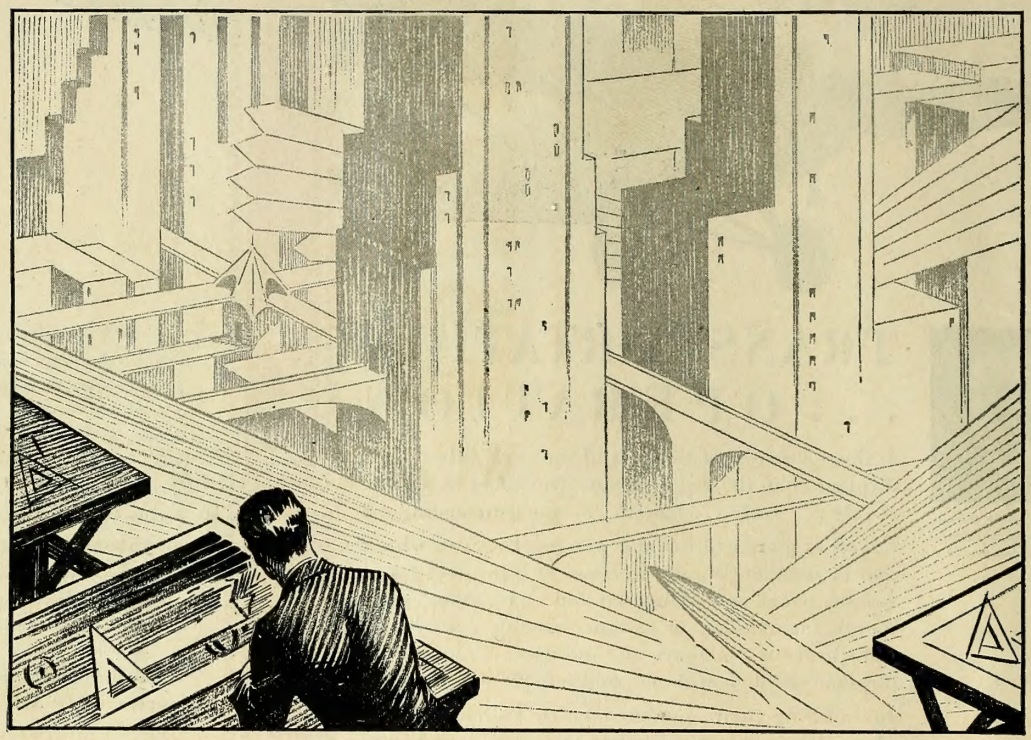
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FAIRCHILD

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Pitcairn Aviation, Inc.
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West Indian Aerial Service
General Airways, Ltd.
Western Aircraft Distributors
Boston Airport Corporation
Western Canada Airways, Ltd.
Prospectors Airways, Ltd.
United Air Lines
Philadelphia Air Transport

D O U G L A S

F I R S T A R O U N D T H E W O R L D



What is coming tomorrow? It is the duty of the Douglas engineer to find out, today!

THIS is the age of modernism. The traditions of yesteryear have been scrapped. New standards have arisen in their places. An age that considers it commonplace for a man to rest comfortably in his easy chair in California, and, at a twist of a dial, listen to music generating in New York, has forced that man to lose his old sense of proportions. Where he thought in hundreds just a few years ago, he speaks in terms of millions today.

And the end is not here. The scene is rapidly shifting. Leaders in the fields of Architecture, Engineering, Finance, Commerce and Industry are seeking new improvements that will surpass the needs of today, and meet the demands of tomorrow. But what has this to do with aviation?

As other fields change, creating a multiplicity of problems, aviation must keep pace. The Iron Horse, as wonderful in its day as the modern giant bomber, is still a locomotive, yet it is pitifully incapable of coping with modern rail transportation problems.

Realizing this, Douglas engineers are keeping step. Ever experimenting, they seek that new improvement in airplane design, today, that will be the accepted refinement of tomorrow. Neither accepting nor rejecting a new idea, the spirit of the Douglas engineering department is—"Try it and test it. If it proves worthy —develop it until it meets the Douglas standards for perfection so that, standing on its own merits, it serves to proclaim—Douglas Means Dependability."

T H E D O U G L A S C O M P A N Y

Santa Monica *California*

WHY...



TIMING GEARS?



COUNTER WEIGHTS?



CONNECTING RODS?



REDUCTION GEARS?

WHY so many unnecessary parts? Necessary parts to the conventional type of airplane motor, but unnecessary, *non-present,* in a Fairchild Caminez Engine, which has less than two-thirds the parts of other radial crank engines of the same horsepower. Aside from the fewer parts to wear, all the bearings in a Caminez Engine are anti-friction. Consequently the only maintenance required is that of grinding valves and replacing worn rings—which is rarely necessary under three hundred hours normal operation. When essential, however, two men can disassemble a Caminez Engine, grind the valves, replace the piston rings, if worn, and reassemble it in less than four hours. Compared with the servicing required by other types of engines, the Caminez can truly claim minimum maintenance. For more pertinent particulars, pertaining to Caminez performance... operation... mechanical structure and economic advantages, address the Fairchild Caminez Engine Corporation, Farmingdale, Long Island, N.Y.

SUBSIDIARY OF FAIRCHILD AVIATION CORPORATION

U. S. Department of Commerce Approved Type Certificate No. 1



CAMINEZ ENGINES

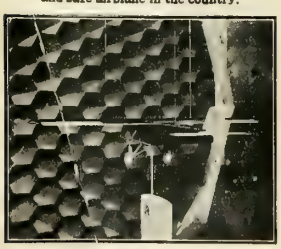
Curtiss Robin

Built to Curtiss Standards of

WHEN the Curtiss organization does anything . . . it does it right. This is entirely true of the Curtiss-Robin. The same care, skill and accuracy that have made Curtiss an outstanding name in aviation have made this monoplane the finest commercial airplane manufactured today.

From propeller to tail skid, the "Robin" is built strictly to Curtiss standards.

The Curtiss-Robin model was subjected to many tests to make it the most stable and safe airplane in the country.

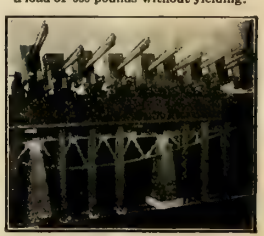


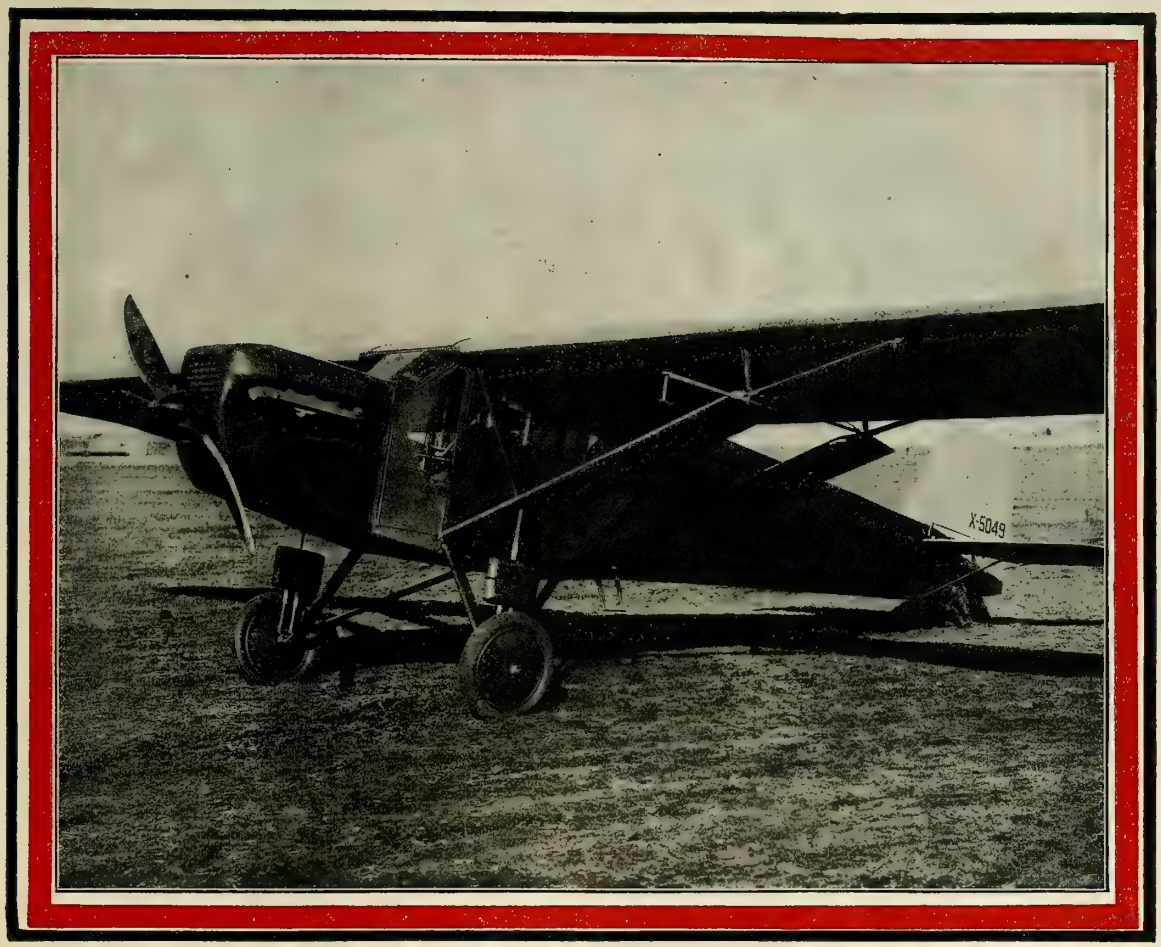
See the Curtiss-Robin at the *Aeronautical Exposition, Los Angeles, September 8 to 16.* Study its complete streamlining and total lack of parasite resistance. Note its pleasing orange and yellow coloring . . . distinctly visible in all kinds of weather.

Step closer and inspect the lacquer on the fuselage and wings. Look at the compact instrument panel and the luxuriously comfortable cabin built for quietness and relaxation. The hardware and appointments compare with those found on fine motor cars. Sit inside and look out through the full-vision windows at the front and sides.

The outside evidence of thoroughness and attention to details is an indication of the rigid, durable construction of the framework. Special tubing of Chrome-Molybdenum is used throughout with all joints solidly welded. The wings are formed around the latest type of one piece stamped Alclad ribs. The Curtiss-Robin is one of the first commercial airplanes to use these strong, light, non-corrosive ribs.

Typical one piece stamped rib in Curtiss Engineering Laboratory. This rib weighs only .59 of a pound and takes a load of 535 pounds without yielding.





Safety—Dependability—Stability

As you inspect these details, remember that every part of the Curtiss-Robin has undergone exhaustive stress analyses, material tests and structural tests. These parts have been proved more than the Department of Commerce requirements. This plane is designed and built to accommodate air-cooled motors when they reach a popular price level.

Unobstructed visibility is an important feature of the cabin. Notice the wide windows at the sides and the skylight at the top.



The Curtiss-Robin is powered with a Curtiss OX-5-90 horsepower motor. With a useful load of 700 pounds, it has a cruising range of 10 hours, or 785 miles; at full speed 6 hours, or 580 miles.

The "Robin" takes the air after an unusually short run and climbs rapidly without stalling. In the air, the ship is remarkably steady and dependable.

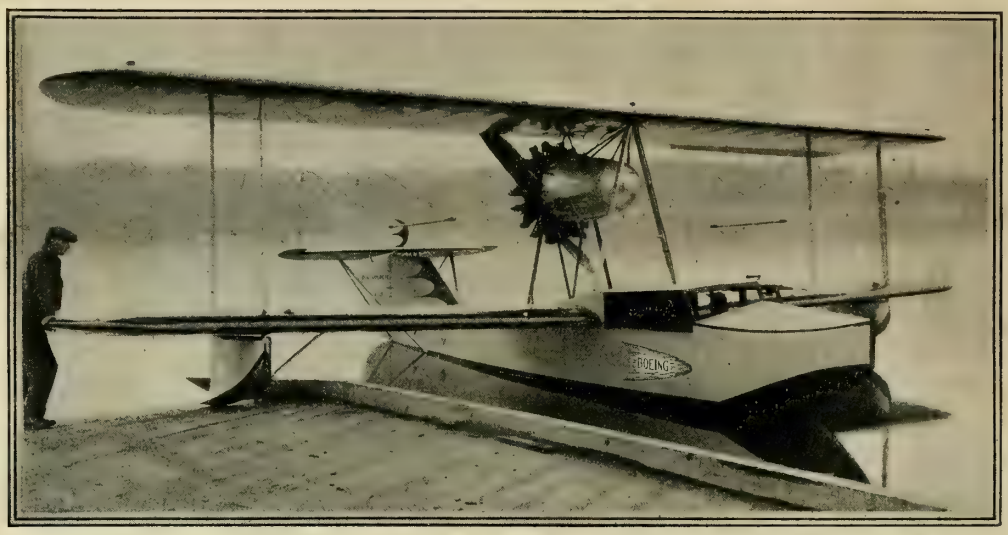
It has a landing speed of 40 miles an hour. It is a safe, perfectly balanced monoplane that recommends itself to pilots and private owners not only by its solid, sound construction and stable design . . . but also by its unusually low price of $4,000.

Follow the performance of the Curtiss-Robin in the *National Air Races*. It will prove itself as capably and brilliantly as it did in the recent *National Air Tour*.

Study the appointments of the interior; the luxurious upholstery, deep cushions, baggage compartment and windows.



If you cannot inspect the Curtiss-Robin at the *Aeronautical Exposition*, let us send you free descriptive literature of the ship that has won the admiration of pilots and prospective airplane owners from coast to coast. CURTISS-ROBERTSON AIRPLANE MFG. CO., Anglum, St. Louis County, Mo.



BOEING

A remarkable record of service behind Boeing Flying Boat B-1E

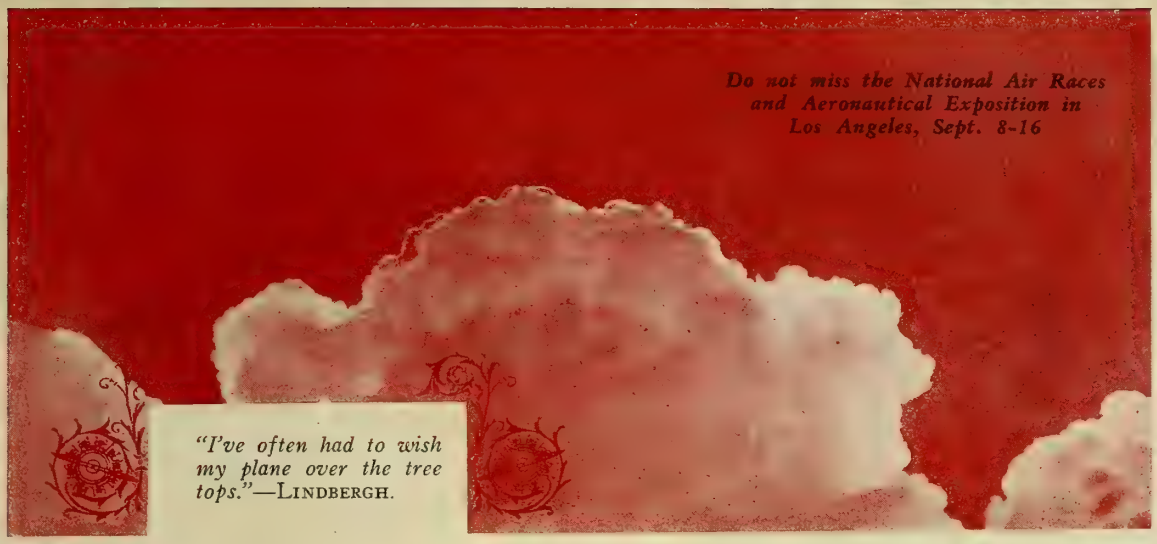
THE new B-1E Boeing Flying Boat is a redesign of the famous B-1 plane which has so successfully carried the foreign air mail between Seattle and Victoria for the past eight years. From all available records it is believed that the original B-1 has had *more service than any airplane now in existence.*

Boeing-built planes are dependable—day in and day out. Exhaustive aeronautical research, exacting construction standards, sound engineering design and unexcelled manufacturing facilities have established and will maintain Boeing leadership.

Boeing Airplane Co.

Seattle, Washington

Mail by Air and Speed it There



. . . . . YOUR NEXT THOUGHT

When you are forced to dive your ship into the small landing field—your next thought—"How am I going to get her out." In out of the way places, the uncharted landing fields—small and difficult—but land you must. Dive your ship into it and then depend on Naturaline* to get you out—you don't have "to wish her over the tree tops" with Naturaline.

Just any number of pilots today quite properly fuel with Naturaline on their cross country jaunts. It lifts them out of tight places. The added R. P. M. of Naturaline is what does it—surprising even to veterans. "You'd think the ship had high lift wings," said one of them. "Man! how you can nose her up when you've got Naturaline."

With Naturaline you can get an increased R. P. M. of from 50 *to* 125 *at any given throttle.* The complete combustion of this super aviation fuel leaves no condensed unburned gases that cause after heating. You'll have a cooler motor and less overhaul cost with Naturaline.

*Naturaline is made from natural gasoline and demonstrates a decided superiority in quick starting, fast pick-up, greater speed—20 to 25 percent more power.

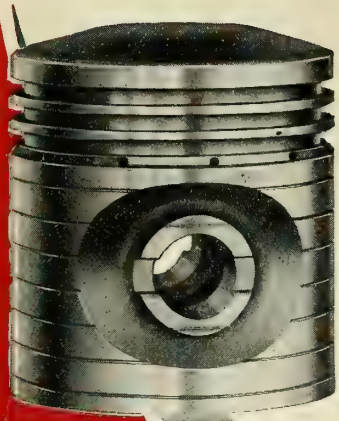
It has a high volatility without gas lock, complete combustion and complete burning even at low temperatures, does not cause the carburetor to freeze at high altitudes and WEIGHS 46 POUNDS PER 100 GALLONS LESS THAN DOMESTIC AVIATION FUEL.

NATURALINE COMPANY of AMERICA

CHESTNUT & SMITH BUILDING TULSA, OKLAHOMA



Greater Strength Extreme Lightness



IN the aircraft industry, as in no other business, the inspection of motor parts is and should be most rigid and exacting.

Bohnalite castings invariably square with the most precise requirements.

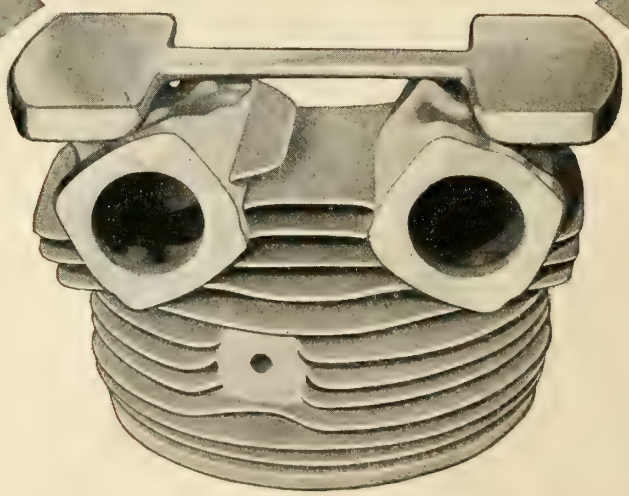
This latest light alloy of greater strength and extreme lightness is more and more becoming the standard for aircraft pistons, cylinder heads, crankcases, etc.

Bohn engineers will be glad to study your problem either for experimental or for production purposes.

We will be glad to correspond with motor builders, aeronautical engineers or pilots. It will pay you to learn more about Bohnalite.

BOHN ALUMINUM AND BRASS CORP.
Detroit, Michigan

BOHNALITE





AIR MAIL

In December, 1918, there were 218 miles of air mail routes with two station stops. In July, 1928, there were 10,816 miles of air mail lines in operation with 72 station stops.

4,093 miles of mail airways are scheduled making 33,236 miles flown daily with mail, and to be flown.

13,594,085 air mail miles have been flown from 1918 to 1927. Nine million pounds of mail have been carried by air during the same period. 133 pounds was the average load per scheduled trip in 1927 on internal contract lines with an average income of $320.00 a trip. 7,974 trips were made.

The air age is here. The Phillips Petroleum Company is co-operating in aiding the air mail in every way possible. Expressions of confidence in Phillips products are shown by such air mail contractors as the Boeing Transport, Inc., Robertson Aircraft Corporation, The National Parks Airways, and The Western Express in the use of Phillips Aviation gasoline—a stable one hundred per cent gasoline refined especially for aviation use.

Now available at Chicago, St. Louis, Rockford, Clinton, Des Moines, Iowa City, Omaha, North Platte, Cheyenne, Rock Springs, Salt Lake, Wichita, Bartlesville and Amarillo Airports.

Phillips Petroleum Company

BARTLESVILLE ▾ OKLAHOMA

WORLD'S LARGEST MANUFACTURER OF NATURAL GASOLINE

Phillips Aviation



Like a Great PARKS

WANTED! 5000 Airplane and Engine Mechanics

Five thousand trained airplane and engine mechanics are needed at once. 50,000 will be needed next year. For every plane that flies, twenty experts are needed in production and maintenance.

Airports are opening every day. New transport lines, new factories, new dealers and distributors are starting every week. Factories are expanding, doubling and tripling their capacities. "MEN—MEN WHO KNOW AVIATION!" is the cry of the industry.

Parks Air College gives a Complete Course in Airplane and Engine Mechanics, qualifying you at low cost in 4 months as Airplane and Engine Mechanic—ready for a big paying job in aviation. This is a special Course for men who do not want to fly just now—who want a good job on the ground NOW and will fly later. The man who qualifies may rise in a few months to Superintendent, Designer, Engineer, General Manager! Realize this opportunity, then make your start.

$125 A WEEK is an average salary for a foreman in an aircraft or engine factory. Graduates of our Advanced Airplane and Engine Mechanics Course can expect to make that in a short time. Some will make more. Many will rise to Superintendent, Engineer or General Manager. Mechanical training is the road to ownership of factories and transport lines. The greatest pilots, the greatest executives of the air, once started as mechanics. They rose fast because they knew the details of airplanes and motors, the fundamentals of the whole business of aviation.

HERE'S A COMPLETE, ADVANCED MASTER AVIATION MECHANIC'S COURSE

Parks Students learn by doing—by actually performing every conceivable operation on Whirlwinds, OX5, OXX6, Liberty, Caminez and other airplane motors.

They take down and assemble airplanes of many types. They can learn every truss and spar, every wire and turnbuckle, every screw, bolt, and nut! A Parks graduate knows airplane construction from start to finish. All this training is given by airplane, engine and production experts under actual factory conditions. While taking this course you can live right on Parks Airport, in our Dormitories, built especially for your convenience. It will cost you only $3 per week. You can eat in our restaurant so your total living expenses will be only $8 or $10 per week!

INVESTIGATE—GET THE FACTS

Maybe it sounds too good to be true—4 months' training that will make you a master Airplane and Engine Mechanic. But it's a fact. And the demand for men—the opportunity—is tremendous.

The industry is crying for men—and paying unheard of salaries. Ford, Travel Air, Stinson, Swallow, Cessna. Curtiss, Douglas, Waco, Fairchild, Ryan are only a few of the factories that are turning out thousands of ships. Men are needed to build them—to build the motors, to service them, repair them.

Don't delay getting into this great industry until thousands are in. Get your training now while men are scarce and salaries high. Don't let the cost trouble you. Full training in our Complete Advanced Airplane and Engine Mechanics Course is $300. Right now we have a special rate. Men are needed. Our best advertisement is satisfied graduates. For thirty days you can have this $300 Advanced Course for only $215, of which you can earn $50 on the Airport, leaving only $165 to pay in cash for this Complete Course. *But you must come now.*

Mail the coupon with deposit to hold yourself a place at the special rate, then take the next train for St. Louis—for success and fortune. If you want to wait for further information send for a free copy of "The Man Who Tunes the Plane," that gives full particulars. But act now! Many will come at once. *Either you come or send for the booklet today!*



Complete training in *every* branch of aviation, that's what Parks Air College offers you!

And now, through arrangement with a new $2,000,000 *St. Louis Aircraft Manufacturing Corporation, we offer possibilities of a job to every qualified graduate of Parks Air College!*

Whether you want to work in St. Louis when you graduate or in any one of the other one hundred airplane factories or on one of the 1500 Airports in the United States—the *first* question your employer will ask is—"Where were you trained?"

Will *you* be able to say Parks Air College? Are you going to get *your* training at the largest and most elaborately equipped Air School in the United States? Remember, that to graduate from Parks gives you a definite recommendation.

So come to Parks at St. Louis! Learn to fly on *new* ships, licensed by the Department of Commerce. Fly behind *new* OX5 and Whirlwind motors. Take your instruction under nationally known Transport pilots.

PARKS Air

MISSOURI THEATRE BUILDING

The Largest Civilian Air



University Offers Full Training

and possibly a job when you finish!

Parks Air College has 25 training planes, representing nearly a $75,000.00 investment alone, with 15 transport pilots, nine special buildings—hangars, shops, dormitories, recreation rooms—everything needed for your comfort and training. Grounds, buildings and equipment represent $250,000.00—no school like it on earth!

Students are enrolled from every state in the Union. Parks is putting many more men into aviation than any other school in the world.

If you could stand on Parks Airport, only 15 minutes from downtown St. Louis, hear giant motors roar into action and see the training planes go sweeping into the sky—you would be thrilled as we are thrilled with this new, vital industry of aviation.

Department of Commerce statistics show there is need of more than twice as many pilots as there are pilots and students enrolled in all schools in the whole United States combined! That is opportunity!



COLLEGE *inc.*

ST. LOUIS, MO.

School in America

We do not just teach you to "get by" in aviation. Parks graduates are going out qualified for success.

Start Now

Come *NOW* and get this training that will put you far out in the lead—that will start you on the road to success and plenty!

Complete Training

Right now you can receive our Regular Flying Course and Regular Pilot's Ground Course at a saving of $155!

These courses not only teach you to fly but include aerial navigation and meteorology, motor work on such famous engines as Liberty, OX5, Caminez, Whirlwind and others, airplane design and construction, shop production methods, air law, and a host of other subjects.

Students are daily choosing Parks after personally inspecting many other schools. One says: "I selected Parks over eight other leading schools. You are decidedly in a class by yourselves."

Don't Delay

Come at once to Parks at St. Louis and start your training. If you come *this month* you can have the regular Flying Course and the Regular Pilot's Ground Course *both* for $295 instead of $460! You can save $155 *and in 2 months be ready for a job in the new $2,000,000 Airplane plant now building on Parks Airport!*

Now here is your chance. Come at once. Send a $25 deposit with the coupon to hold yourself a place at the special rate now in effect. Then catch the next train for St. Louis. Delay is dangerous. Or if you want to wait for further information, mark the coupon for our Mechanics catalog, or Flying catalog, whichever you prefer. *But Act Now.*

Parks Air College, Inc.,
202-F Mo. Theatre Bldg.,
St. Louis, Mo.

☐ **I enclose $25 deposit on the $165 rate for the regular $300 Advanced Ground Course**

or

☐ **Send me "The Man Who Tunes the Plane."**

or

☐ **I enclose $25 deposit on the $295 rate for combined Flying and Pilots Ground Course.**

or

☐ **Send me "Skyward Ho!"**

Name .....

Address .....

The Ultimate Ship for Sport Flying



PERFORMANCE

MAXIMUM SPEED
115 m.p.h.

MINIMUM SPEED
32 m.p.h.

ABSOLUTE CEILING
21,000 feet

SERVICE CEILING
18,000 feet

RATE OF CLIMB
1050 f.p.m.

Fifteen minutes in the cockpit will convince you that this is the ultimate ship for sport flying.

Price, $2500 at factory.
(Subject to change)

SNAPPY take-off . . . rapid climb . . . "two finger" controllability in the air and on the ground . . . 115 M.P.H. top speed . . . 32 M.P.H. landing speed—such performance is a pleasure to even the "old timers".

The Arrow 2-place biplane with the dependable 60 H.P. LeBlond radial air-cooled motor has many salient features which the prospective purchaser can fully appreciate only after he has flown it.

In this list of incorporated features you will find the real "makings".

Steel tubing Warren truss fuselage.
High lift wings with high lift-drag ratio.
Steel constructed tail surface.
Flippers controlled by positive action push and pull rod.
Wide tread split type landing gear.
N struts in wings optional.
Side by side dual control.

Arrow Aircraft Corporation

Havelock, Nebr.



A woman flies the Atlantic

Another Triumph for AC

AMELIA EARHART, first woman to fly the Atlantic, owes her success to able piloting and remarkable engines equipped with AC Spark Plugs.

Miss Earhart and her courageous associates had good reason for selecting AC Spark Plugs, already used in record-breaking flights by Lindbergh, Byrd, Acosta, Chamberlin, Maitland, Hegenberger, Stinson, Haldeman, Schlee and Brock. Overwhelming evidence of superior worth.

AC has developed two successful types of Aviation Spark Plugs; get the one suited to your type of engine.

AC type "N," our Regular Metric Aircraft, is recommended for aviation engines of the air cooled type, among them Anzani, Cameron, Caminez, Clerget, Continental, Curtiss Racer, Kinner, LeRhone, Menasco-Salmonson, Pratt & Whitney, Ryan-Siemens, Siemens-Halske, Szekely and Wright.

AC type "N-1," known as our Metric Semi-Aircraft (Modified Aircraft), is recommended for aviation engines of the water cooled type, among them Curtiss OX_5, and OXX6, Hall-Scott, Hispano-Suiza, Liberty and Packard.

Use AC Spark Plugs, proved, by every test, *standard of the world.*

AC-SPHINX
Birmingham
ENGLAND

AC Spark Plug Company
FLINT, *Michigan*

AC-TITAN
Clichy (Seine)
FRANCE

Dirt in oil means wear. The AC Oil Filter keeps oil clean. Put in an AC Renewal Cartridge every 10,000 miles. That makes the Filter good as new

© 1928, AC Spark Plug Co.

AC SPARK PLUGS . AC SPEEDOMETERS . AC AIR CLEANERS . AC OIL FILTERS . AC FUEL PUMPS
AC GASOLINE STRAINERS . AC AMMETERS . AC OIL GAUGES . AC THERMO GAUGES

Say you saw it in AERO DIGEST





The new Goodrich plane a few minutes after it had landed at Akron after its first flight from New York.

"Via

...that's how Goodrich Aeronautical Service now travels



Goodrich



the AIR LANES"

GOODRICH'S first airplane . . . Silvertown.

Purchased to speed officials of the Goodrich aeronautical division more swiftly to distant flying fields and plants where their advice and counsel are sought.

Purchased to give wings to Goodrich service . . . to quicken cooperation . . . and to facilitate sales.

This first Goodrich purchase is a forerunner of what aviation can expect from modern business.

Commercial enterprise needs aviation . . . and in time will buy airplanes for swift transport as surely as Goodrich has done.

The Goodrich "ship of the air" is equipped, of course, with Goodrich Silvertown Airplane Tires.

THE B. F. GOODRICH RUBBER COMPANY, *Established 1870*, Akron, Ohio



Rubber *for Airplanes*



Over scorching desert or snow-capped peaks

-TP- Aero protects your motor

-TP- Aero, the Original Wax Free Oil is straight run refined from *100% pure paraffin base crude oil*, yet WAX FREE which is responsible for its LOW POUR. And as a fine paraffin base oil, it holds its viscosity despite high motor temperatures.

Fill up with -TP- Aero and you will immediately notice the increased r. p. m. Your oil pressure will increase and your guage will show this greater pressure is maintained. Your spark plugs will stay clean longer and give a hotter spark. And you will get more flying hours per gallon

Impose your own conditions, make your own tests. -TP- Aero will surprise you with its performance. It is an entirely new oil, made especially for aircraft motors. If your dealer cannot supply you, advise us.

See our exhibit at the Aeronautical Exposition, Los Angeles, September 8-16

TEXAS PACIFIC COAL & OIL CO.
Fort Worth, Texas

free—*Pilot's Log Book, 36 pages of blank forms with handsome durable cover. Free to you—send the coupon.*



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Fort Worth, Texas

Please send me, without obligation, your Pilot's Log Book, described above.

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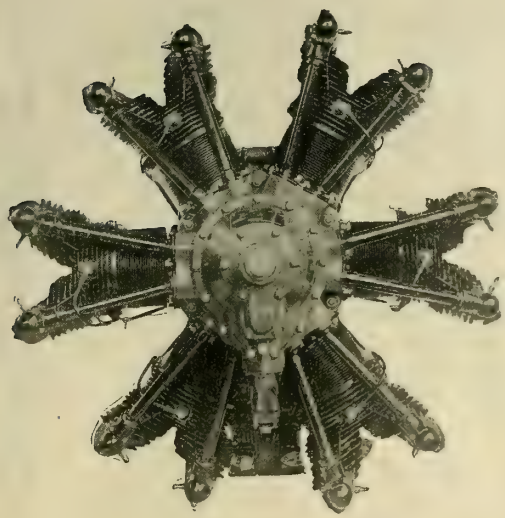
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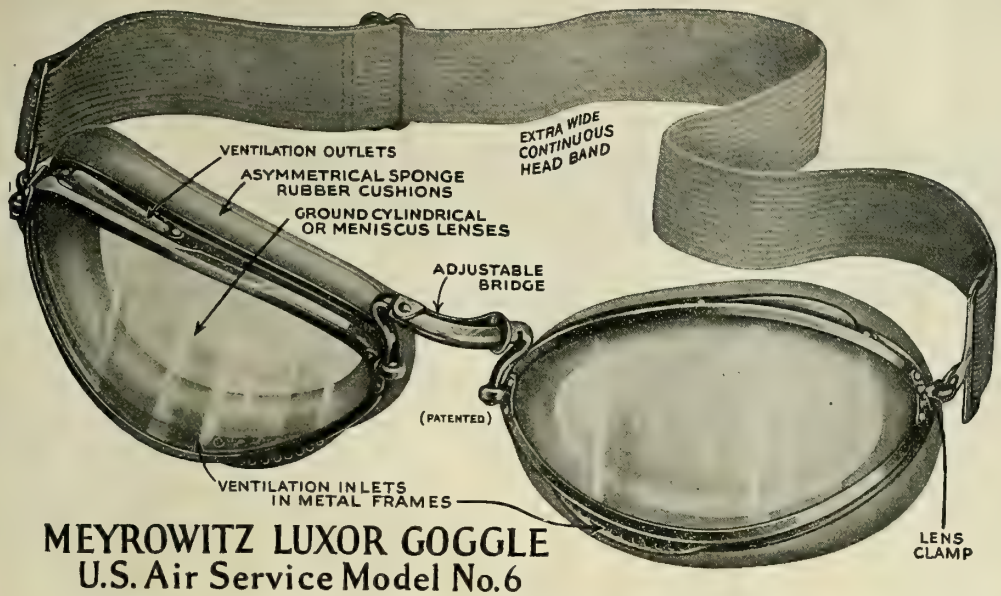
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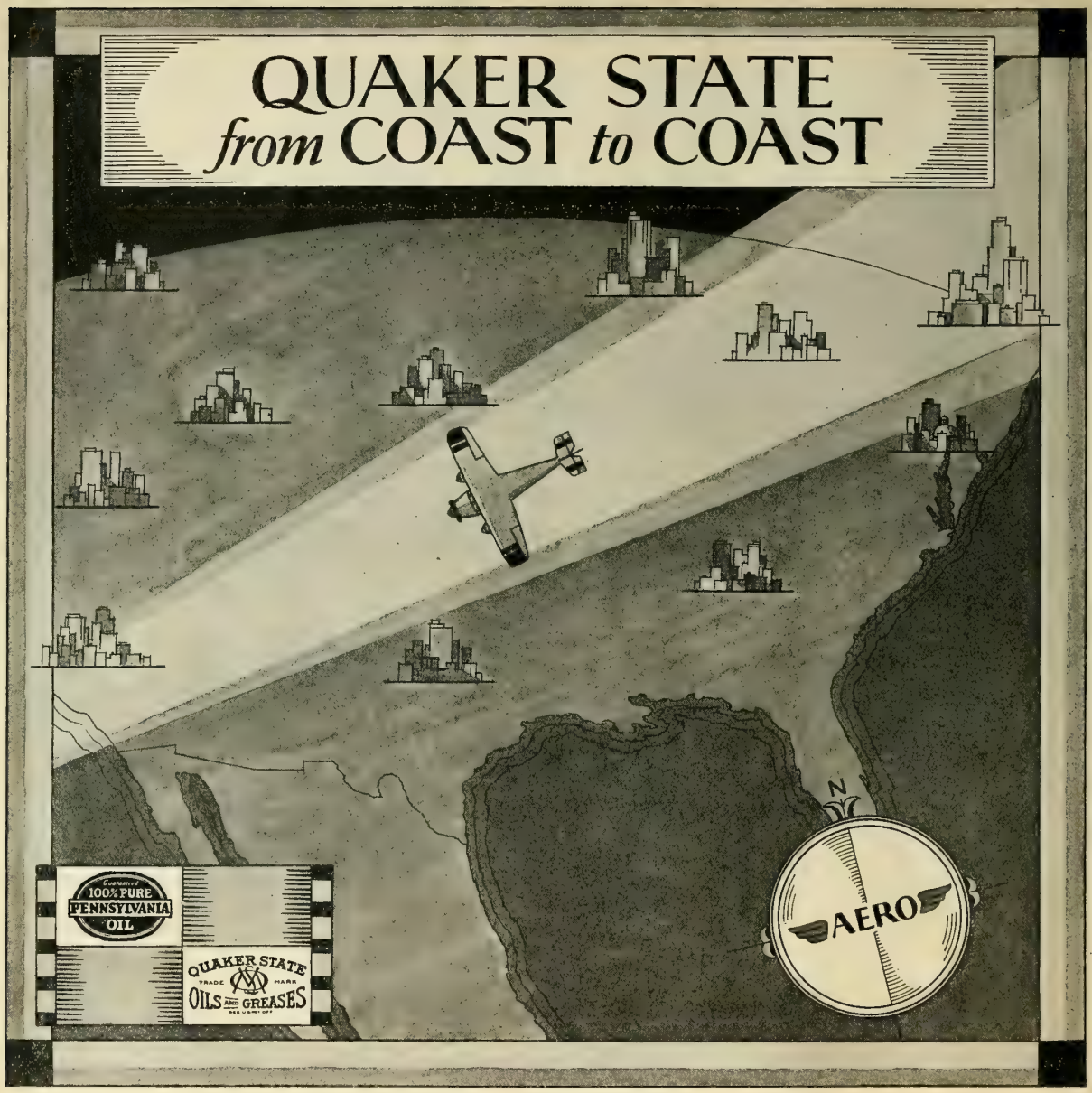
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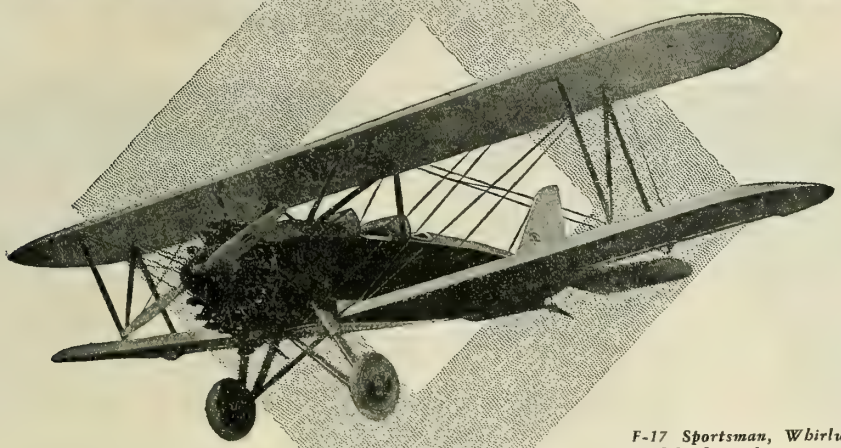
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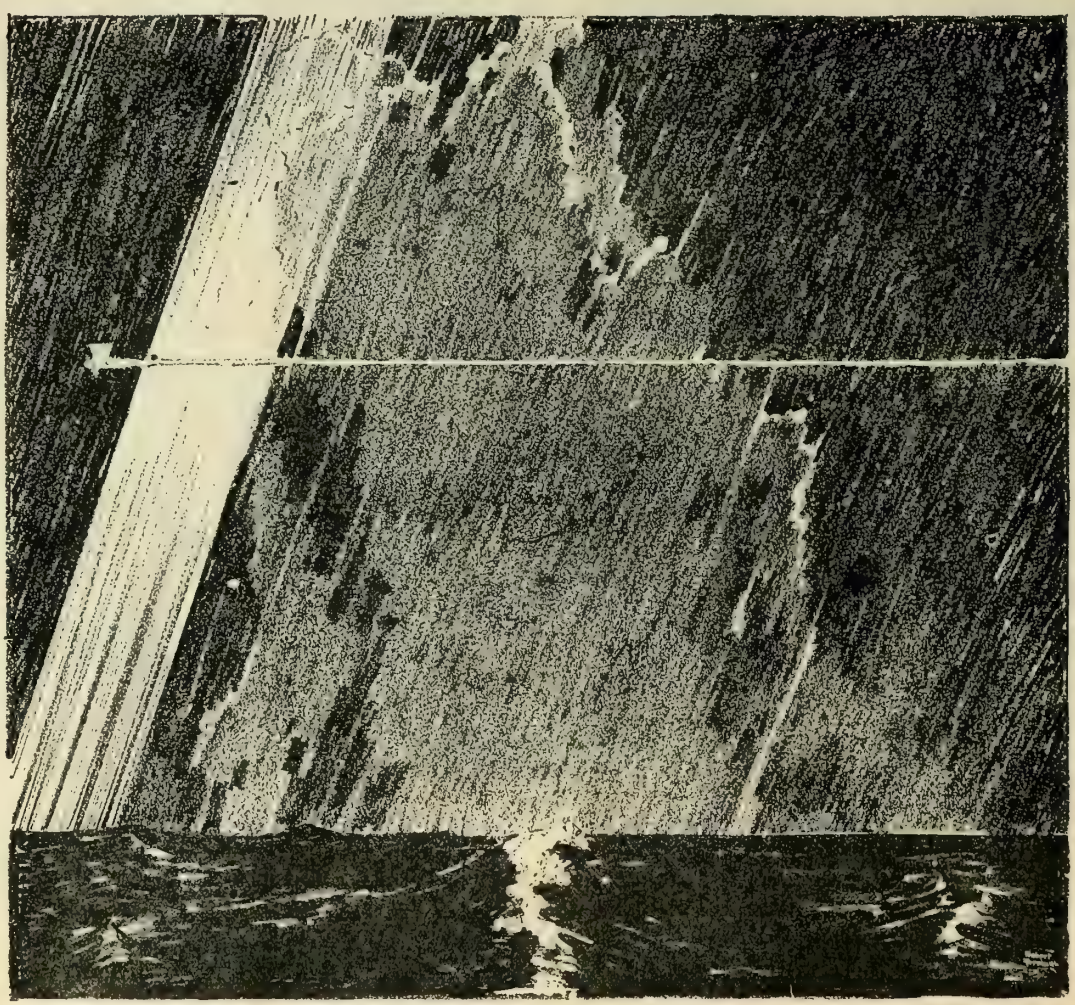
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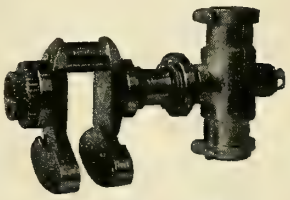
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Knuckle Pin Lock
Crank Pin Washer
Cam Bearing Spacer
Propeller Hub
Crankshaft Thrust Bearing Spacer
Woodruff Key
Blower Shaft
Exhaust Valve
Exhaust Valve Plug
Crankshaft Rear Gear
Blower Intermediate Gear
Cam-Inlet and Exhaust
Push Rod Rocker Ball Cup
Push Rod Ball Socket
Clamp—Propeller Hub
Gear—Starter Shaft

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BECAUSE so many operators of flying organizations are contemplating transport work, either on an occasional or a regular schedule, there is naturally great interest in planes suited to that work.

The Ford plane is built expressly for it. To render dependable service, free from forced landings. To maintain schedules through the varying weather of the four seasons. To furnish comfortable aerial transportation to passengers in its roomy, enclosed, heated cabin. To provide economies in handling and operation. To resist depreciation to an unsurpassed degree, and to permit the frequent and easy inspection careful operators insist on.

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Any information you may desire on Ford planes may be obtained by communicating with us.

THE STOUT METAL AIRPLANE COMPANY
Division of FORD MOTOR COMPANY
Dearborn, Michigan

SPECIFICATIONS

Ford Tri-Motor Transport Model 4-AT

DIMENSIONS

Span	74 ft.
Length	49 ft. 10 in.
Wing area	785 sq. ft.
Height	12 ft. 8 in.
Wheel tread	16 ft. 9 in.

POWER PLANT

The standard equipment power plant consists of three Wright 220 H. P. Whirlwind engines.

Optional at extra cost, wing engines Wright Whirlwinds, center engine Pratt & Whitney, 9-cylinder, radial, 410 H. P. Wasp engine.

Also optional, extra cost; all three engines Pratt & Whitney 9-cylinder, radial, 410 H. P. Wasp engines. Total H. P. 1230.

PERFORMANCE

High speed	114 M. P. H.
Cruising speed	95 M. P. H.
Stalling speed	55 M. P. H.
Radius of action (cruising)	570 miles (6 hrs.)
Ceiling	14,000 ft.

For operation from landing fields in high altitudes a wing of slightly greater span is provided, increasing the wing area fifty square feet.

Propellers are Standard Steel Company's steel hub, duralumin blade propellers.

The entire plane is built of duralumin, a non-rusting, non-corroding, copper-aluminum alloy as strong as steel but only one-third as heavy.

DATA

Weight, empty	6,100 lbs.
Useful load	3,900 lbs.
Total weight, loaded	10,000 lbs.
Gasoline capacity	235 gal.
Wing load, per sq. ft.	12.74
Power load (lbs. per H. P.):	
2 engines	22.7
3 engines	15.15
Cabin capacity:	
Width	4 ft. 11 in. (average)
Height	5 ft. 1 in. to 7 ft. 8 in.
Length	15 ft. 9 in.
Passenger accommodation	350 cu. ft.

(*Seats for ten, removable; baggage hold, toilet, etc.*)

Volume 13
No. 3

AERO DIGEST

SEPTEMBER
1928

THE MAGAZINE OF THE AIR

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San Fernando Valley, California, on the Western Air Express route

AIR TRANSPORTATION ON A PAYING BASIS

By Harris M. Hanshue

President and General Manager, Western Air Express, Inc.
President American Air Transport Association

WHEN the federal government decided in 1925 to invite private capital to the development of air transportation by offering air mail contracts as a source of basic revenue, a group of western capitalists agreed to finance an operation between Los Angeles and Salt Lake City. The stock of Western Air Express, Inc., was subscribed by these men in amounts of a few thousand dollars each. No promotion stock was taken by any one and no commissions were paid for the sale of stock. Each share issued netted full value to the company treasury.



The capital so provided was carefully conserved. We felt the necessity of holding our cash investment to the practical minimum at the same time providing the very finest equipment and the best qualified personnel to be had. We selected a proven airplane powered with a proven engine that could carry our anticipated maximum load at the high altitudes to be reached on this route and at a cruising speed of several miles an hour faster than schedule requirements. This, we calculated, would make for maximum economy in operation and maintenance. Initial cost of equipment, although an important consideration, was subordinated to the necessity we felt for providing the practical best that could be obtained; and, since our treasury had not been depleted by cuts taken out for promoters and stock salesmen, we were able to go into the market and buy the planes of our choice in sufficient numbers to give us an adequate equipment reserve and still retain a paid-in cash surplus sufficient to make up operating deficits which might occur during the first several months.

Had our original capital been raised through paid agents or had we issued promotion shares our financial position would not have been so secure and our chances of getting over would have been materially reduced. Instead of having every dollar of stock issued represented by 100 cents in treasury we would have had only from 50 cents to 80 cents, according to how strong the issue was watered. This would have amounted to inflating the cost of installation to the company by from one-fourth to twice the actual value and have placed the operation under such a financial handicap as would seriously jeopardize its chances for success. Up until this time—1926—no air transport operation had proven definitely profitable. It was evident that in an industry so little understood all resources must be conserved and every intelligent economy diligently practiced if the venture was to prove successful.

And, aside from the direct advantages gained by keeping the paid-in capital intact, there was an indirect but equally valuable result in public prestige and popular goodwill. It very quickly became generally known that no one was taking a profit from organizing the company and that we were determined to give our patrons the very best service taking our chances for earnings with the patronage we could attract. This attitude impressed the public with our sincerity of purpose, our confidence in the essential value of air transport as an agency of commerce and our intention of rendering the best service within our capacities.

Public confidence in and approval of this enterprise came so quickly that, long before we were prepared to start flying, it was plainly evident we would have the active support of our entire territory. Convinced of our integrity of purpose, newspaper publishers, chambers of commerce, civic organizations, large financial and industrial institutions—in fact all of the agencies of community influence—put themselves actively in support of the program.

Once the question of equipment was decided and the order placed we turned to the problem of securing an air and ground force of such proven ability as would assure the best possible operation. Pilots and mechanics, field managers and shop foremen, were selected on a basis of known record. Here, as in the matter of equipment, we felt that our obligation to the public as well as protection of our investment demanded that only the best available material be drawn upon.

Our entire organization was practically complete more than three months before operations were to start. But, to keep down pre-operating extravagances and conserve company funds for investment in revenue producing equipment, no one was placed on the payroll until we felt a pressing need for such services. The flying force was assembled about thirty days before the inaugural flight and sent by automobile truck over the entire 600-miles of airway for an intimate ground inspection of the course they were to fly. These men laid out emergency fields, placed markers on the course and studied conditions on each of the more than eighty landing places on any one of which they might some day be forced to land.

The result was, each pilot had an intimate acquaintance with the airway—a precaution which has repaid itself many times during the thirty months they have flown this route.

As each employee affiliated with the company he was advised against buying its stock at that time unless he had surplus funds he could afford to lose. The original staff were assured that if and when the operation proved profitable they would be given an opportunity to secure stockholdings. That gave them the incentive—without the hazard of their money—to work for the financial success of the company and, that this did result, is seen from the fact that practically all of them took up the stock allotted a few months later. To secure this stock for the original employees, the company arranged to finance their individual purchases on a time basis at low interest that made payment easy.

(Continued on next page)

The question of putting our service before the public in such a way as to attract a volume of business that could warrant continued operation was a problem of first importance. If we were to hold to our purpose of using our cash insofar as possible for the purchase of airplanes and the immediate costs incident to their operation we could not go into an extensive advertising campaign. The potential volume of traffic under the air mail rates and the limited value of service then maintaining would not warrant advertising appropriations.



Interior view of a Western Air Express plane.

After studying the question, we called upon the publishers of daily newspapers, chambers of commerce and postmasters throughout our territory explaining our position and asking their coöperation. The part these agencies have played in developing an air-consciousness among the general public is the direct cause of the phenomenal volume of air transportation developed on the Pacific Coast. Instead of assuming a cold, formal business attitude toward this new industry and insisting upon our buying whatever space was to be devoted to developing air traffic, the newspapers opened their columns and entered enthusiastically upon a program of popular education in aeronautics.

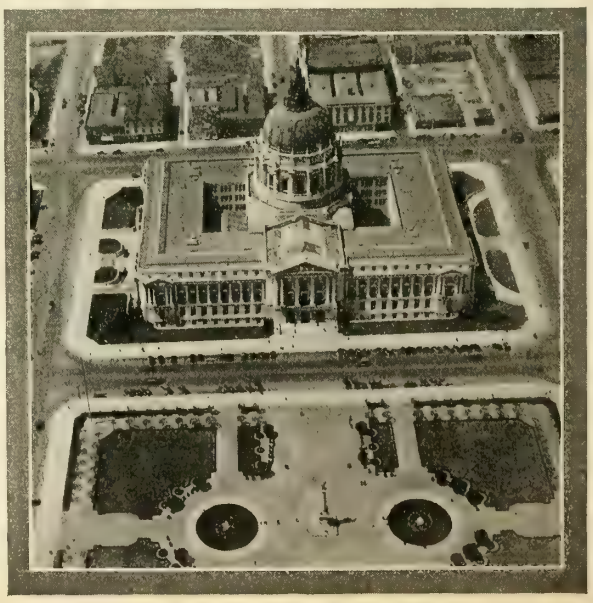
Through the press we were able to set forth clearly the advantages of air transport as interesting and novel incidents occurred in the normal functioning of our organization. Postmasters and chambers of commerce lent material assistance in personally contacting individuals. The postmasters, through their crews of mail carriers, have distributed millions of pieces of literature informing mailers of air mail rates, air mail service, and how to use it.

Our solicitation of air mail patronage was based upon the theory that every mailer was a potential user of air mail. The large business institutions, we felt, would use this service as a matter of economy once it became known to them. But the great bulk of individual mailers must be reached and converted to air mail service if we were to quickly develop a steady flow of substantial volume. Our traffic salesmen were instructed to see everyone they could. In their canvass of business districts they visited every door on the theory that it was impossible to say who might have need of air mail.

The belief that in this way the entire public would soon become air-mail minded was rapidly born out in increased loads. For a considerable period each of our men contacted more than 100 persons daily. In this general canvass, also, they were able to quickly catch any misunderstanding of the air mail service; to find those points on which education should be stressed and, within a few weeks of beginning operations, we were concentrating our efforts on disseminating four bits of information which embraced everything it was necessary for the general mailer to know regarding air mail. This simplification of air mail instruction was materially aided by establishment of the 10-cent per half ounce blanket postal rate early in 1927.

To get over these points, the territory was saturated with blotters; newspapers and trade journals were flooded with brief notices; for several weeks the metropolitan papers carried slug-lines bearing on these several points; radio broadcasting was arranged and our traffic men went before every gathering that would grant them audience to discuss the service and its advantages. This work was carried on throughout Southern California. More than 400 postmasters were contacted regularly; chambers of commerce, 150 in number, were enlisted in the work and talks were made before hundreds of social and civic groups.

Public confidence, initially secured by the manner in which this line was financed and launched, was intensified by the success which attended our operations from the outset. The communities we served were impressed with the fact that we were selling transportation and not stock. We appealed to them for patronage on a purely business basis. The result was a volume of traffic from the initial flight which gave us a revenue sufficient to properly operate and maintain our equipment and make material improvements in the service which, in turn, tended to increase the degree of public confidence in our enterprise.



Over San Francisco's City Hall.

In my association with the air transport industry, I find my greatest satisfaction not in the fact of material success but, rather, in the clean record that made possible the success of Western Air Express.

AVIATION PROGRESS

By
William P. MacCracken, Jr.
Assistant Secretary of Commerce for Aeronautics

BEGINNING with its first successful flight, almost 25 years ago, the airplane has rapidly and steadily progressed—through the experimental and pioneering stages, into the gruelling test of air warfare, past the "gypsy" stage of the first commercial flying, across oceans startling the world and on to its acceptance as an efficient servant of modern business.



With each step the pace has quickened until with the spectacular development of the past two years and a resulting high public interest, aviation has zoomed into national prominence as an industry. In almost every phase of this industry there has been a huge and gratifying increase in the volume of business handled. Airplane production has more than doubled in the past year and at that manufacturers cannot begin to supply the increasing demand for modern planes. One parts manufacturer reports producing material at the rate of 900 civilian planes per month. The engine factories are likewise over-burdened. Airport equipment manufacturers are barely able to keep up with the pace set by the hundreds of cities which are providing landing facilities for transport lines and for the non-scheduled air services.

The air transportation system now consisting of almost 16,000 miles over which nearly 40,000 miles are flown daily, is an indication of the progress that has been made in scheduled flying.

In commercial training schools there has been almost incredible expansion. Up to August 1, 1928, the Department of Commerce received 5,676 applications for student pilot permits. During the last three months 2,927 medical examinations for student pilots were received. There is nothing to indicate any decrease in this activity during the next year.

There has been not only marked growth of business which was already organized but new forms are developing. One of the most important of these is the definite establishment of combined air-rail passenger services. Scheduled passenger service may be classified as follows: (1) Direct service from origin to destination; (2) Combined air and railroad services; (3) Scenic tours.

The first of these is offered by airlines operating passenger planes directly from city to city on schedules over regular routes. The number of companies giving this service and their traffic are both steadily increasing. The equipment has already been greatly improved in regard to safety, comfort and reliability. Speed, too, is increasing constantly so that the elapsed time between airports is lessened. Cities are securing airports closer to their business districts than was formerly the case and improved surface transportation facilities are being provided, thus eliminating delays after landing.

The combined air and railroad passenger service is quite new although it has been in project for several years. A few lines have started operation including a rail trip to Chicago and an air connection from that city to the Twin Cities and an air route connecting with an Ohio railroad. Another company is soon to start operations between Louisville and Columbus in conjunction with a railroad passing through the latter city. There is a much longer route which will cross the continent with two days of air travel and two nights of railroad travel and will make the trip from Chicago to the Coast in two nights and one day. Other lines are being seriously considered for establishment in the near future.

The scenic flights or tours are the evolution of the joy hops, which, though still popular, are not sufficient to satisfy those who formerly desired only the thrill of a first flight. Short scenic trips are now made at numerous cities and over many of the picturesque spots of the country. Mount Ranier and the region surrounding Seattle and Tacoma may now be reviewed on regular flights of this kind. There is an established air tour service at the Grand Canyon. On the Salt Lake City-Great Falls route the contractor is planning a tour over Yellowstone Park. The battlefield at Gettysburg is viewed regularly from the air. There are other flights of this nature in many parts of the United States and new ones are constantly being initiated.

The transport companies are not overlooking this important factor for, in addition to establishing short trips at their basic airports, they point out the scenic attractions along their routes, sometimes preparing folders to help passengers distinguish such spots.

Another outstanding development of the year is the change in the aviation insurance situation. Although the rates are not yet standardized and there are many elements still under investigation, the aviation insurance market has been broadened by established companies of good repute and large resources entering this field.

This recognition by the larger companies that such insurance is now possible without prohibitive premiums is in itself a sign of the favorable attitude of business toward the industry. Probably within another year the careful research and study now being made will show where present difficulties lie and will make possible lower rates, broader coverages and a resulting increase in the volume of business written.

Organizations engaged in financing installment sales are interesting themselves in aviation as an opportunity to employ available capital. They enabled the majority of American motorists to buy automobiles on deferred payments. With the application of this successful system to the airplane market there should be a substantial increase in airplane sales. It is to be expected that this method of purchase will be used widely within the next year or two. Proper insurance will, of course, be a factor here just as in the purchase of an automobile on such terms.

One of the biggest forward steps taken this year has been that of reducing the air mail rate. That it has been possible to reduce the rate proves two things—the air mail has the confidence and interest of American business men and the economic foundation of the private contract system is sound.

Already there has been a great *(Continued on page 612)*

AIR—HOT AND OTHERWISE

New Life for the Old Chamber

Secretary Wilbur—Please Note!

By Frank A. Tichenor

EVERYTHING comes, they say, to him who waits. Well, mebbe so. Anyway, something sometimes comes; that's sure. And something has come to the whole industry in the new set up of the Aeronautical Chamber of Commerce on the regional plan, with headquarters in New York and a vice president apiece for regional divisions at strategic points throughout the country. Good idea, that. Puts the Chamber in position to do very competent work marked by a complete understanding of special interests, demands and aspirations. We here in AERO DIGEST office feel sure that we shall be able to travel pleasantly along with the reorganized Chamber, be helped by it and we will endeavor to help it.

We have been waiting a long time to see the Chamber spurred to the point where it would (and could) arrange to cover the field and do the needed things. That there is a real necessity for an organization of this sort everybody connected with the industry must know.

In the past the activities of the Chamber have been limited by lack of finance and possibly by lack of vision, possibly, also, by selfishness, on the part of some individuals.

The injection of new blood in the person of "Smiling" Jack Harding has helped a great deal. He got out in the field, mixed with the people who are doing things and reported back to New York about the things which they are doing. Possibly these reports were in the nature of an education to some of the members who had become imbued with the idea that the aviation interest in the United States began in New York and ended in Washington.

At first the possible sales field was, perhaps, limited to these towns, and, without promotion, it scarcely could go beyond them.

So the industry, unwilling to perish out of the air above the earth, developed many good promoters for itself. Let us consider, for example, Lindbergh—a very bright young man who will be heard of in the great world, some day. And others who soon or late will attract public attention are the Fords, the Guggenheims, Chamberlin, Byrd, Goebel and Tucker. Every now and then one of these names even now gets into the newspapers, somehow or other. Of late there has been quite a little talk about them.

Expansion, as a matter of fact, has been phenomenal, if not 100 per cent effective. It cannot be 100 per cent effective without organization. We saw that, and that the Chamber ought to be its medium, but we did not see sure signs that the Chamber would direct its activities so as to meet and further the new and growing requirements.

And so we hesitated about joining it. And, to be perfectly honest, those in charge of it wore no path to our doorway in persistent efforts to induce us to become their little playmates. Had they been married to us it is likely that in some states we could have been divorced without much difficulty on the ground of incompatibility.

But a change has come. We, we think, remain the same, but new officers have been chosen by the Chamber. The new spirit of representation is bringing new manufacturers into its membership. Plans are being made which indicate that the Aeronautical Chamber of Commerce is to write its pleasant mark across the skies as a one hundred per cent institution—one hundred per cent representative of a one hundred per cent industry.

This is really great news, meaning much for the future.

We are optimistic. We have applied for membership and we shall give the Chamber all the support of which we may be capable. We're for it—now. Every interested body should join and make it more so, every day in every way.

Luther Bell, the old war horse of aeronautical publicity, is back in the harness and rearing to go—and with "Smiling" Jack and Owen Shannon as team mates there should be some real action around the Chamber headquarters from now on.

If the Chamber doesn't function it will be the fault of its members. We believe it's going to function and we want to be a part of it. There is much for it to do and it will be real fun to help it do it.

A GREAT subject for every American to give some thought to just at present is the result of the series of air raid maneuvers which were held over London a few weeks ago. A quarter of a million English women, children and men, were theoretically smothered by gas dropped from the skies, and heaven only could make a guess at how many it would be fair to assume, in theory, were blown to bits by deadly explosive bombs.

A multitude of Londoners gazed up in awe, which tried hard not to be real nervousness, as the buzz of a hundred bombers in many massed "attacks" began softly, like the humming of bees, accelerated gradually to a roar as the planes reached points directly overhead, and then faded to a hum again and silence as they made their way back to distant bases—having theoretically left behind a prostrate, bombed, gassed and destroyed metropolis, while suffering slight damage themselves.

Such an episode would have less significance to an American city had it occurred in and above one. Here it would be regarded merely as an interesting sensationally thrilling bit of showmanship, probably fraught with propaganda for big appropriations down in Congress.

For no American city ever has been air-raided as London has been, by an actual enemy. Americans have not heard the dreadful crash of high explosives in their streets. They have not seen residences and business structures crumble under attack from the sky. They have not helped to pull the dead and dying out of the ruins of their towns or listened to hushed tales by others who have done so, the printing of all details in the press being forbidden by the censor.

So such a sham air raid as was staged over London might not greatly startle the Americans.

It startled London, for all those things which I have said Americans have never done Londoners actually have done.

Sitting beside my desk as I am writing is a man (and an old fighter, too) whose breath came a little quicker and whose hands involuntarily clenched as he read the stories of the sham raids which were cabled from London. In London, in Manchester, in Paris during the war he was present while the enemy was really dropping bombs.

"But the planes which made those raids were nothing to the planes of today," he commented. "And they could come from comparatively short distances. European cities, each in a little country with, usually, not much more than an imaginary line, or perhaps *(Continued on page 618)*

SOME THOUGHTS ON AVIATION

By Glenn H. Curtiss

as told to Fay Leone Faurote

THE best landing field in the world is not a field at all. It is the surface of a lake. I have never been able to understand why flying boats have not kept pace with land planes. I have built and flown both types and to my mind the flying boat has so many advantages over the land type of plane that, were I given a choice between the two types of craft, I should take the flying boat every time. Besides it is not difficult to equip a flying boat with wheels which may be used for an emergency landing on land and it is not difficult to land in snow or take-off off the ice.

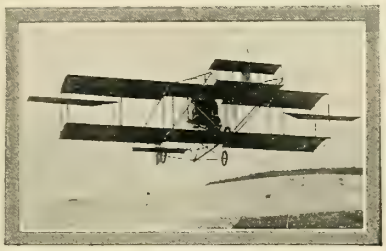


A new portrait of Mr. Curtiss on his ranch in Florida

For cross-Atlantic traffic a three, four or five motored flying boat offers the logical solution and while a number of successful crossings have been made with the land type of craft those pilots who have survived were fortunate enough not to have to make an emergency landing. With a large flying boat, however, a temporary landing at sea is not difficult or suicidal.

During the war we built a flying lifeboat with sheddable wings. With such a boat, well stocked with provisions, the pilot and passengers would stand a good chance of being rescued. In fact with such a type of hull, which had air compartments, a cruise of several hundred miles could be made in an emergency with safety.

As soon as the art of flying has developed a little further I look for a return to the primal popularity of the flying boat. Furthermore, it is the logical flying craft for not only the coasts but for the Great Lakes and Mississippi regions. With the network of lakes and rivers which we have in America there is little difficulty in finding water landing places within easy gliding distance. Flying boats may go from New York to Detroit just as easily as land planes. Take a place like Boston, for example, around which there are not many good landing fields. Here the flying boat is also the proper craft to use. For prospecting in mountainous regions like Labrador and other parts of Canada a secondary base may be established on some accessible inland lake with very little expenditure. South America, too, offers an unusual field for the hydro-aeroplane and flying boat.



Curtiss' famous Gordon Bennett racer

In many localities where the ground is uneven, where rocks predominate, where thousands of dollars must be spent to make a landing field of even small dimensions, there is nearly always a lake or river nearby. Then, too, the air currents over water, particularly near the surface, are not apt to be so treacherous as over land in such regions. I remember that in my flight down the Hudson from Albany to New York, that in passing such mountains as Storm King and Bear Mountain, also near West Point, violent gusts of air swooped down upon me, to escape which I was forced to seek a lower strata nearer the placid surface of the Hudson. Of course such air conditions do not bother the pilot of today with his more efficient plane and greater power, but I cite the instance to emphasize the point that flying over water is apt to be a little safer and easier. If you do have to make a forced landing there is a pretty good chance of getting out alive. Byrd found this to be so in making his landing off the coast of France.

Of course the argument is often advanced that the flying boat is apt to be heavier, but this is not necessarily so with proper design and proper weight distribution. The ratio of weight to power may be maintained in as favorable a proportion as is the case with land planes.

It will probably be some time before a New York-London aeroplane line is in operation. While a reasonably large plane with a cruising radius of four or five hours is easy enough to build yet one capable of fifteen to eighteen hours continuous flight, carrying the necessary fuel and those conveniences which de luxe passengers would demand, calls for a much larger and heavier machine than has yet been built.

While we are learning something about air navigation yet flying at night and in a fog must be made safer before we can hope to put passenger carrying on a safe basis. Radio seems to be a dependable agency for determining one's location and maintaining a definite course.

I look for big improvements to be made in this field of navigation. When we have aeronautical instruments that are accurate and reliable, which will tell us at a glance where we are, what our course is, our altitude, our deviation, drift and other essential facts, then will night flying or day flying in a fog be wise.



The first demonstration of the practicability of aircraft operating in connection with battleships—Curtiss and his hydro-aeroplane being lifted aboard the U. S. S. Pennsylvania at San Diego, 1910

I have often been asked about the helicopter. I have built and operated this type of aircraft. At Hammondsport we constructed what, I think, was the first helicopter which successfully rose from the ground. Such machines are, however, difficult to control and while they are made to rise easily enough yet they require considerable space in which to maneuver, a fact that would seem to more than over-balance their hovering ability. It is not much of a trick to make a small aeroplane that will hang by its propeller but such a craft is not good for much after it is made.

THE DEFENSELESS BATTLESHIP

By
Cy Caldwell

This is the third of a series of articles by Mr. Caldwell on the ineffectiveness of the battleship as a weapon of national defense since the development of the bombing plane.

IN two preceding articles in AERO DIGEST I discussed the battleship's inherent ability to remain afloat if damaged by air attack, and its maneuvering ability to evade air attack. From facts presented in those articles I concluded that if the ship were to depend solely upon its structural characteristics and maneuverability that it could neither evade nor withstand attack from the air. In this article I shall examine briefly the powers of aircraft to inflict damage upon battleships, and shall consider somewhat lengthily the power of the battleship to defend itself against air attack and to destroy its attacker.

This power of defense, so far as standard naval thought on the subject goes, is vested, not in other aircraft, but in the antiaircraft gun. That is an entirely logical naval conception, growing naturally out of a century of American naval practice. For the pet weapon of the Navy is the gun. It is the only weapon that offers any reason for the continued being of the battleship. For a battleship is nothing more nor less than a floating gun platform from which heavy guns may be fired at another battleship. Therefore it is not at all strange that when stereotyped naval minds consider defending the battleship from enemy aircraft that they should turn to the gun, which is precisely what they have done.

Testifying before the President's Aircraft Board in September, 1925, Rear Admiral Charles F. Hughes, United States Navy, said: "Antiaircraft is the principal issue in the Navy. We have increased the percentage of its merits with the ships. We are carrying on experimental work all of the time as to method, and the bureaus are furnishing us new instruments."

Admiral Hughes spoke truly when he said, "Antiaircraft is the principal issue in the Navy." Unfortunately it is. In fact, practically the whole of naval thought has been devoted to thinking out ways of fighting aircraft, instead of considering how aircraft may be used to fight other navies. The entire trend of naval thought, with the exception of that small part of it resident in the Bureau of Aeronautics, has been devoted to a consideration of how aircraft could be destroyed, instead of how aircraft could be used.

This question was asked by a member of the board. "General Coe has stated to this board that 'The antiaircraft weapon will furnish effective protection against a bombing plane seeking to reach a small definite objective.' What is your opinion regarding that?" Rear Admiral A. E. Coontz, U. S. N., replied: "In all the antiaircraft practices that I have witnessed, particularly when they towed the sleeve, I have always been glad that I was not the sleeve. . . . And we are going to get more and more accurate in our antiaircraft fire; because in these things, as in everything else, we are making progress every time we hold one of these affairs."

"One of these affairs" in which a target is towed and is fired at by antiaircraft batteries is described by Admiral Hughes: "—we have one towed by the *Shenandoah*. We fired 835 shots at it, and there are 807 holes in the target, of which 12 are holes where a full shell went through. This was towed at an altitude of 5,000 feet, and was a large sleeve, 10 feet in diameter by 45 feet long. The speed was only 30 knots, but that was because the wire was not strong enough to hold it at any other speed."

That is certainly a peculiar test on which to base any optimism regarding the accuracy of antiaircraft fire. There was the poor old *Shenandoah*, lumbering along at less than the top speed of a destroyer, and dragging a large target at a height which, if it was not previously known to the gunners, easily could be determined after a few shots. The *Shenandoah* herself made a wonderful mark from which to range on the sleeve target; and if each enemy bomber were to be towed into position by something like the old dirigible, crawling through the sky at 30 knots, it is very probable that the bomber would be shot down. However, it is highly improbable that bombers will arrive in that manner; they will arrive at speeds of over 100 miles an hour, at any height between a few hundred and many thousands of feet. This test, therefore, was the nearest approach that the Navy could make to firing at a stationary target. Yet they gravely produce it and display it before the President's Aircraft Board as an indication of what antiaircraft may be expected to do against a rapidly moving bomber, flying more than three times as fast as the *Shenandoah* flew, and at a height that would be unknown, even approximately, to the gunner until after several practice shots had been fired—by which time, of course, the bomber would have dropped his bombs and flown away.

I have quoted this testimony to show the affection and esteem in which antiaircraft guns are held in the Navy. Yet a consideration of the problem of hitting an airplane with a 5-inch shell or fragment thereof will show it to be such an involved affair that the only wonder is that naval enthusiasts can pin their hopes to such a weapon. In the first place, before you can fire a shell at a target you must know where the target is; and in the second place you must overcome the natural disadvantages of firing from a rolling, moving platform like a battleship at sea.

For the first problem, it may be stated flatly that there are no instruments for determining the exact position of an airplane in the air at any given moment, from the deck of a battleship. Range-finders may be ruled out, for they will not give accurate results on small moving objects; besides, a range-finder on one battleship would not give the plane's position. If sights could be taken simultaneously from two battleships some distance apart and could be communicated instantly to each other, calculations could be made which would show the position in the air that the airplane had occupied at the moment when both sights were taken. But even if this could be done in seconds, which it cannot, calculations take time—and in that time the airplane has moved from that position. Therefore the best that any sighting could show would be the position that the airplane *had occupied when the sights were taken.* Even this is impossible to attain from the deck of a battleship. So even allowing that the sighting produced some approximately accurate result, it would give the gunner no more than a certain starting point from which he would have to *guess* the position that the airplane would reach when his shell arrived in its vicinity.

And here we have a further delay, incident on the setting of the fuse and the laying of the gun. Before the fuse can be set to explode the shell at the height of the airplane, the gunner must know that height. It takes time to tell him: it takes him a few seconds to set the fuse; it takes a few seconds to rotate the loading tray to bring the shell in line with the firing chamber of the gun; it takes more seconds

to ram the round into the chamber; it takes a second to fire the gun; and if the airplane is 15,000 feet away it will take the shell about 5 seconds to reach its objective—for a shell has a muzzle velocity of 3,000 feet per second.

Considering the above factors in their entirety, and allowing that the least possible time has been consumed in these actions of sighting, laying, fuse-setting, and firing, is it not evident that the best time that any gun crew could make would be at least 20 seconds? And in one-third of a minute a bomber has travelled over half a mile, at the lowest estimate of its speed. So it is quite evident that the crew should not be aiming at the exact spot in the air where the sighting showed the airplane to be—even allowing that the sighting did show that, which I do not admit that it did with any exactness. If the crew wished to hit that airplane, they should fire at some point more than half a mile away from the spot where the airplane had been when the sights were taken. And where is that point? Is it directly ahead on the line of flight of the airplane? And if so, how far ahead? And how fast is the plane? And is it going to turn immediately after the sights are taken? And if so, which way, right or left? Or is it going to dive, or fly along level, or climb? *Where is the damn thing going to be, anyhow?*

That is the question that gunners must ask themselves. And the answer? *They must guess the answer. There is no other way.* All this talk of range-finding and sighting is futile. After the sighting comes the calculation interval, the fuse-setting interval, the loading interval, the striking interval of the shell itself—any time from 20 seconds to a full minute. And in a minute the bomber may be two miles from the spot where sights were taken—or it may have turned and come right back to that spot.

But all of this is so obvious, even to the layman, that the Navy itself now admits that it is impossible to "aim" at an airplane in the air and hit it, except by odd chance. The Navy knows that they cannot hope to hit an airplane by firing single shells at it, so they claim that a barrage of shells will do the trick. But a barrage sent up by 8 5-inch antiaircraft guns on the *West Virginia,* or by 8 3-inch guns on the *California,* is subject to the same limitations imposed upon the single gun. The only difference is that instead of one shell being delivered to a certain area at a certain time, eight shells are delivered. But they also must be delivered to that guessed-at position, just as the single shell was delivered there. So we come right back to the subject of *guess-work,* only guessing in larger numbers.

But Rear Admiral Coontz is very satisfied with this barrage, as he proposes filling the air with shells at a certain point, for in his testimony before the President's Aircraft Board he stated: "There is *only one place up in the air* where a plane can be when it drops a bomb if it is going to hit you." But let me quote the questions by Senator Bingham and Admiral Coontz's answers in order that you may see the peculiar lack of knowledge of aircraft enjoyed by senior officers in the United States Navy:

Senator Bingham: "You did not mean to say that there was only one place in the air from which a bomb could be dropped in order to hit a ship, did you?"

Rear Admiral Coontz: "I mean there is *only one place he can get at the particular time when he releases the bomb.*

The Chairman: "If you know the altitude?"

Rear Admiral Coontz: "Yes; if you know the altitude and everything is all right. You know when a fellow comes along that you must allow for speed and everything else, and *he has to be at a certain place.*"

Senator Bingham: "Suppose a dozen different planes are coming along?"

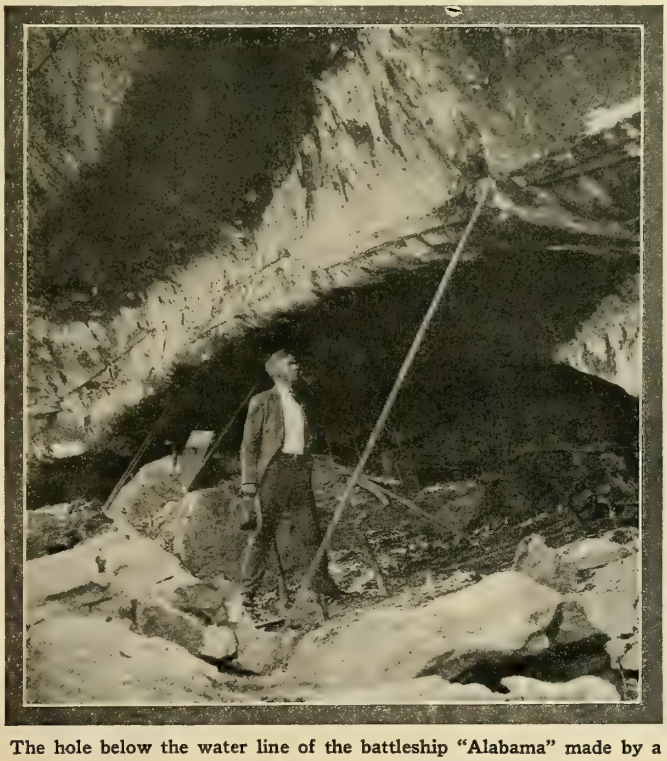
Rear Admiral Coontz: "Each one *has a certain point,* as he crosses the line of fire fore and aft. And with 12 of them coming from a dozen different points that ship is going to get the range, and when they come *to the proper place* there is going to be something that will happen to the planes."

Senator Bingham: "But they do not all have to get at the same point."

Rear Admiral Coontz: "They have to get pretty close to the same point, unless they can drop a bomb that will go a little sideways in the air."

Now, I am extremely sorry to have to hop on Admiral Coontz, for he is probably a very agreeable old gentleman. In his testimony he displays a native and unaffected simplicity, an ingenuous naïvete, that I find charming and refreshing in this age of callous unbelief. He actually believes that there is *only one point in the air* where an airplane can be when it drops a bomb that is bound to hit either on or close alongside a battleship. Yet surely he cannot have forgotten that the *Colorado, Maryland,* and *West Virginia,* the three most modern and most nearly perfect American battleships, are each 624 feet long and 97 feet 3½ inches wide. Allowing that the effective hitting distance of a large bomb is at least 50 feet from any point on the ship, that gives us an area 724 feet long by 200 feet wide, or an area of 144,800 square feet, *in any part of which a bomb may be dropped with the certainty that it will damage the battleship.* How, then, can it be correct to state that "there is only one place he can get at the particular time when he releases the bomb?"

As a matter of fact,



The hole below the water line of the battleship "Alabama" made by a 2000-pound bomb which fell 40 feet away from the ship.

the bomber need not be above this large area of 144,800 square feet at all. He may be away outside of it. With the gliding trajectory of the bomb, due to the 100 mile-an-hour speed of the airplane, the bomber may be several hundred feet outside of this area, and still have his bomb fall in the center of it. Especially if the wind direction is from his line of flight to the battleship, his distance from his target may be materially increased. And if the bomber uses a gliding bomb his distance from his target may be measured in thousands of feet. Also, Rear Admiral Coontz seems to have overlooked the torpedo plane. Suppose six bombers were dropping bombs from above, at heights varied from 5,000 to 20,000 feet, and suppose three torpedo planes were approaching from three different points of the compass, where then is the Admiral's "certain point?"

But the fallacy of Rear Admiral Coontz's viewpoint is so obvious that I need not argue the matter further. I only quote his opinions to show how far at fault senior officers of the United States Navy may be in their estimate of the powers of aircraft, and to suggest that leaving the nation's aerial defenses in the hands of such short-sighted, and ill-informed, though possibly well-meaning men, is utter folly.

Before we leave the problem of "sighting" on an airplane from the deck of a battleship, I must point out that it is quite possible, and under some conditions quite certain, that the battleship will not even see her antagonist in the air. General Mitchell states: "An attack made against battleships by a man who knows his business in the air, that is, an experienced air commander, will result in the destruction of the ship without the people on it ever seeing the airplanes making the main attack." In which case, of course, there will be no question of sighting on aircraft or firing anywhere other than blindly into the sky—a course that offers less than a slight chance of hitting an airplane. In a former article I pointed out the disadvantage to which the battleship would be subject in a night attack—where it was illuminated by parachute flares dropped from planes, while the aircraft stayed above the light and were invisible. And if the battleship used her searchlights she would naturally be betraying her position. In these conditions it is obvious that the ship would not see the planes bombing from even a low height, while the torpedo planes would be visible for only a matter of seconds before they had discharged their torpedoes and flown away. Hence it is apparent that there would be no effective firing by antiaircraft guns—because to hit anything you have to *see* it.

But, let us suppose a day attack, on a day of clear visibility, when even an airplane, unless it is flying at 20,000 feet, is visible for miles. Such a day is rare at sea, but let us allow that such a day is chosen for an attack on a fleet of battleships. Now, the attack is concentric, made from all directions, at all altitudes from the surface of the water up to 20,000 feet. There is a choice of weapons on each airplane of the water torpedo, gas spray, the dropped bomb, the gliding bomb, the aerial torpedo. The airplane does not have to fly above its target, but may hit it with gliding bombs or water torpedoes.

To begin the attack on such a day, airplanes flying high, where they would be extremely tiny targets, would drop smoke and gas bombs, while others could descend lower and drop smoke curtains along the line of progression of the battle formation. And it is not suggested for a moment that all of the planes engaged in that work would escape destruction, for it is impossible to fight a war and not sustain casualties. But if their work was effective—and there is nothing on board a battleship to insure that it will not be effective, even with the loss of some of the attackers—the condition of the fleet soon would be that it was proceeding through clouds of smoke and gas, with a smoke screen shutting off all view in one direction. And from this direction would come the torpedo planes, which would fly through the screen, sight on a ship, drop their torpedo a mile or half mile away from their target, turn about, and again be concealed by the screen—and all in the space of perhaps 15 seconds. What chance, under such circumstances, would the antiaircraft gunners have of sighting, laying the gun, fuse setting, firing—all of which would take at least half a minute? Obviously they would have no chance at all. If they fired one wild shot, point-blank, they would be doing their very best—and at what distance from the battleship would they set the fuse to explode?

What does a very efficient air officer (not an admiral) think of the matter? Here is part of Lieut. Commander H. T. Bartlett's testimony before the Aircraft Board: "Well, of course, a ship is more vulnerable if she has steam up in her boilers and ammunition in her magazines. She also has antiaircraft, which is of some little value, not much. . . . I do not think antiaircraft is at all a serious menace, except the machine gun." (which is good for only very limited range, I may add.) He also said: "A ship cannot possibly dodge in the few seconds that it takes a bomb to fall; it makes no difference what her speed or what she does."

The reader will note that in these articles I have tried to avoid putting forward any unsupported opinion of my own. On the contrary I have quoted the words of men who may be considered experts in their field—men who have had actual experience on which to found their opinions. Now, Commander Bartlett, the best torpedo man the Navy had, conducted one series of tests with torpedoes, attacking a division of battleships in single column head. He commanded the torpedo planes, which were nothing but old clumsy F-5 L boats which could hardly get off the water. The battleship people told Bartlett they would be 50 miles off the Chesapeake Capes at a certain time. Bartlett went out there but they were nowhere to be seen. He was sure of his position so he kept on going 40 miles further and there they were, 90 miles off shore instead of 50. Bartlett immediately attacked, firing 17 torpedoes, 12 of which made direct hits and three of which while lying on the water were run into by the battleships. The ships nearly ran into each other two or three times. Bartlett would have sunk the whole fleet if it had been real war. He attacked them from both sides and got them all milling around in a circle. Needless to say, the publicity on this thing was suppressed by the Navy, who are notorious for trying to get into the newspapers on the slightest pretext. I would ask why no publicity was given Commander Bartlett's test.

I have taken this example of an attack on a clear day to show the worst possible conditions under which aircraft could operate, so far as their own immunity from antiaircraft fire is concerned. But even on that clear day the high-flying bombers would be safe from antiaircraft fire—and when I say "safe" I mean reasonably safe. Do not get the impression that I believe that no bombers ever would be hit by antiaircraft—I intend to convey no such impression. There already has been too much over-statement of the powers of antiaircraft, and too much over-statement of the uselessness of antiaircraft. I seek to draw a balance and examine this thing for what it is worth. Personally, I believe that the Navy place too much importance on this form of defense—far too much importance—and I also believe that airmen generally are prone to under-rate its effectiveness. This latter condition comes, I am convinced, from the ease with which pursuit pilots could escape antiaircraft. The bombers did not (*Continued on page* 620)

INVERTED FLIGHT

The first of a series of articles on inverted flight

By

Lieutenant Alford Williams, U.S.N.

INASMUCH as the pilot of a single-seater or fighting airplane is called upon to maneuver his craft in such a fashion as to train his guns upon another plane or to extricate himself from a disadvantageous position he must at all times be ready to assume any conceivable position in the air. His sense of flying feel must be keenly developed and his execution must be subconsciously directed. The degree of skill and perfection attained will be governed by his physical soundness and by the clarity of his conceptions as to the exact position of his craft and the control dispositions necessary to change that position.

Standing by itself any involved aerial maneuver may be termed Stunt Flying, but just as the spectacular practice maneuver of a destroyer, cruiser or battleship acquaints the seaman with the tactical possibilities of his craft and is of inestimable value in warfare so also the study and practice of all types of aerial evolutions is of essential importance in the education of the aviator. Ability to strike and evade destructive blows is as basically the mission of the airplane as it is of the surface warcraft. Both types rely upon maneuverability, which in turn depends upon mechanical excellence of equipment and the operating skill and experience of the personnel.

Single-seater fighting airplane tactics up to this time have been concerned with evolutions based on normal flight, and, until a few years ago, no serious attention had been given to inverted flight. Unintentional inverted flight in any of its variations may well cause confusion and surprise to an inexperienced pilot; hence the accounts of experiences given by various pilots have not always been in strict agreement. As one result inverted flight has been commonly considered a very mysterious and perhaps dangerous maneuver.



Brief Outline of Lieut. A. J. William's Aviation Activities

1919—April—Made original inverted flight in U. S. N. N-9; also inverted spiral.

1921—March—Made tests on maneuverability of HS2L seaplane. This type of standard Navy seaplane had caused numerous fatalities due to tail spinning. HS2L No. 1368 (Hampton Roads, Va.) was tested for maneuverability. A volunteered effort to find solution for taking this type of plane out of tail spins.

Numerous tail spins were accomplished successfully for the first time and the data tabulated and forwarded to Bureau of Aeronautics.

1922—Represented the Navy as a member of the first Navy Aviation Racing Team (Pulitzer Race) at Detroit, Mich.

1923—February—Report forwarded to Bureau of Aeronautics recommending inspection system for operating Navy aircraft. Attached thereto was first and original inspection report for aircraft used in U. S. Navy. A Board was formed in the Bureau of Aeronautics and the original form was used as a basis for the present system for inspection of Naval aircraft.

1923—October—Winner of St. Louis Pulitzer Race. Commendation from the Secretary of the Navy.

1923—November—Established World's Maximum Speed Record, 266.6 m.p.h., Mitchel Field, Long Island. 266.6 m.p.h. is the American speed record and is so listed.

1924—Made effort to clear up tail spinning troubles of Navy NB training plane. The crash result of this effort brought "auto-rotation" to light.

1925—Represented Navy at New York in Pulitzer Race. Fastest time ever clocked unofficially—302 m.p.h.

1927—Made individual effort of building and flying as seaplane and landplane the fastest airplane yet built in this country. The finances for this venture were obtained personally.

1928—Conducted volunteer tests on Navy Fighter airplane in re-inverted flight. By aid of recording instruments, the first record was obtained as to definite load factors for all forms of inverted flight and maneuvers.

In an effort to clear up some of the disputed points of inverted flight and its modifications, a number of experiments were carried out at the U. S. Naval Air Station, Anacostia, D. C., during the months of February and March, 1928, in coöperation with the National Advisory Committee for Aeronautics. A Navy single-seater Curtiss "Hawk" was used. (It is worth noting that the maneuvers discussed in this article have been investigated from a standpoint of military utility. To execute each evolution, in a specially constructed airplane of slow speed and low terminal velocity and with the propeller set for high static thrust, would simplify matters considerably, and also would reduce the stresses on material and personnel. However, the real reason for the investigation was strictly adhered to.) A three component recording accelerometer was mounted at the center of gravity and a recording air speed meter and altimeter were also installed. These instruments were supplied and installed by the N. A. C. A. This airplane was powered with a Pratt and Whitney "Wasp" air-cooled engine. Auxiliary provision was made for anchoring the pilot in the plane by installing an additional standard safety belt superimposed upon the ordinary belt; the terminals of the second belt being secured to the lower longerons.

Prior to the discussion of such aerial maneuvers as may involve a reversal of reference points it is deemed expedient to reach an agreement upon certain basic considerations. Starting with the aircraft on the ground, ready for flight, our original conception of normal flight is that the plane makes its way through the air in almost the same general attitude in which it has left the ground. The capacity to leave the ground depends upon the lift forces developed by the wings. A conventional wing is substantially flat on its underside and curved or cambered on its upper side. Positive lift is directed from the substantially flat side to the cambered side of the wing. Negative lift is directed from the cambered side to the substantially flat side of the wing. An airplane is in normal flight when its sustentation is derived from positive lift. That is, when the lift is obtained from the combination of the increased air pressures on the flat side of the wing and the decreased air pressures on the cambered side. An airplane is in inverted flight when its sustentation is derived from negative lift. That is, when the lift is obtained from the combination of the decreased air pressures on the flat side of the wings and the increased pressures on the cambered side.

Attempts to distinguish between normal and inverted flight by reference to the translation of the pilot's weight from the seat to the belt is an effort to define by a description of attendant effects but does not go to the essence. For the purposes of this article the terms "normal flight" and "inverted flight" will be used in conformance with the proposed definitions.

The purpose of the maneuvers to be described was to study the forces experienced and the control necessary while maneuvering an airplane in inverted flight. The program included the following: inverted flight—general; inverted turn; inverted tail spin; *(Continued on page 630)*

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BUTLER FIRES A BIG GUN AT THE NAVY

FOR Nicholas Murray Butler we ever have felt profound respect. He is a man with brains enough to have convictions and with character enough to have the courage of them. Recently he took excellent aim and fired a resounding broadside at United States Naval mismanagement. That he also dealt with other little matters, like John Barleycorn and so on, is not subject to comment here.

In his fascinating statement in the *New York Times* he voiced some excellent truths, and expressed some fascinating personal opinions, with which some will agree while others shake their heads. But he did not even mention that economic end of the Naval Program which affects taxpayers in that raw nerve which is so sensitive to the condition of the pocketbook. That was a chance which the distinguished educator missed. It was really a great chance and we wish that he would study it and thrill us with another statement.

Before the establishment by Congress of the Budget System appropriations for the Navy usually called for more than $800,000,000 and the Naval managers usually spent far more than had been appropriated.

With the coming of the Budget, appropriations were pared down to less than $350,000,000. And we have just as much Navy as we used to have at over $800,000,000. Some explanation of this curious phenomenon by one of our great swivel chair Naval experts would be interesting and might give Dr. Butler a new chance to raise his interesting voice.

What did the Navy do with the $500,000,000? Was it waste . . . or—no, we will not say the word. But—

We will say this, however, that had that $500,000,000 been spent for airplane construction there would have been very little need for the President's Aircraft Board or the Lampert Committee.

Dr. Butler has a keen and analytical mind. Here is a matter to which we hope it some day may be devoted.

THE N. A. A.

AERO DIGEST clearly sees the real necessity for a rightly functioning organization to fill the place which the N. A. A. originally was designed to occupy, and does not, but recognizes the fact that under the proper leadership that body itself might admirably fill the bill. If this could be accomplished the organization could be of great assistance at the necessary job of smoothing the pathway for those who have invested time, money and hope in the industry. Especially it could and should coöperate with the Services in their effort to secure that which rightfully they should be given down at Washington.

We repeat, therefore, what we often have said, that the founders of the N. A. A. worked out a charter containing everything essential to an organization which could fully represent the man who flies as well as the industry. The original conception was comprehensive and worth while. If it has slumped there is cause for regret, but if Serge Voronoff can rejuvenate the aged sheep of France someone can be found able to rejuvenate even the N. A. A.

We believe that General Mason M. Patrick is a doctor who might administer this treatment. Give him the chance and a salary that will enable him to devote his entire time to the task and the trick will be accomplished. He is an organizer and quickly would surround himself with the right personnel.

With dues fixed, as we have suggested at $1 the year, and every aviation club in the country invited to join, the N. A. A. soon would be changed for the better.

The clubs will join if they are thoroughly convinced that the N. A. A. is to be refurbished and made really worth joining. And at a dollar every enterprising youngster in the nation will ask Dad, get what he asks for and with it promptly become intelligently air-minded.

But even dollar dues can only do the trick if the N. A. A. is re-made into worthiness of a large membership. Price, alone, never makes a bargain. There must be quality as well.

Organized on the plan which we put forward, members would get $10 worth of service for a dollar. As the organization stands at present they do not get thirty cents worth for $5.

CHASING TIME ACROSS THE CONTINENT—AND CATCHING HIM!

THAT Goebel-Tucker flight was something. Betcha! as we Yanks say, Raw-thuh! as the English say. Not only did Tucker and Goebel lower the trans-continental record by eight hours, but they did it comfortably, almost casually. Food for thought in this performance. It brought the Pacific Coast one hour nearer to New York by air than Chicago is by the fastest rail transport at present operating.

Nor was this a carefully prepared stunt, arranged with earnest, brain-fagging effort and embarked on timorously and prayerfully. Maybe the boys prayed, but they didn't pray with any worry in their hearts. They knew what they were going to do and the plane with which they were going to do it. It was a stock model Lockheed Vega without even one special dab of fancy paint, powered by a Pratt and Whitney Wasp of the usual 400 h. p., both of types available continually in the open market to anyone who wishes to buy. Yet—we all heard the record crack!

Now that they have led the way with this magnificent performance they or somebody else soon will lower by many more hours the astounding record which they made.

Think it all out and tell grandpa if you want him to believe that you're a liar.

They had luncheon in Los Angeles, one day, and they had breakfast in New York the next!

AERO DIGEST ventures the prediction that within another three years pilots and passengers will breakfast in Los Angeles and have luncheon in New York!

Give these American air engineers and pilots enough encouragement and they'll accomplish anything—and then some.

REDUCED AIR MAIL RATES

THE reduction in air mail rates was distinctly an intelligent move. AERO DIGEST had been fighting for it steadily and hopes it helped to bring it about. At any rate it is operating exactly as we said it would. The increase in the volume carried was almost instantaneous. Real intelligence marks this detail of procedure down in Washington. Full planes at low rates are more economical than empty planes at high rates.

SCHOOL BELLS AGAIN

By Don Rose

THEY tell me over at my favorite flying field, (name and address on request), that at the end of prolonged rainy periods when the flying crew has been bogged down for weeks on end, pilots are sometimes caught reading these articles of mine in AERO DIGEST. This may be merely a local peculiarity or it may be a national vice. In either case I want to make it clear right away that this piece is not for pilots. It is not for pilots or students or mechanics or government inspectors or members of the Internal Department of the State of Pennsylvania. It is not for the standing army, the sitting navy, or the marine corps of the United States. It is for a national group, bloc, or class vastly more important than any of them.

In other words, it is intended for schoolboys. The copy of AERO DIGEST which comes to our local library goes dog-eared and dirty within three days of its arrival, principally through the kind attentions of high-school boys. Probably it is the same wherever there is a wide-awake library doing business. These boys will be the future leaders of our industry.

This copy appears at the time when school bells everywhere are being tuned up for the fall performance. From mountain and seashore, from summer camp or summer job, from busy play or plain loafing, there begins the annual migration back to books and desks and chalk and Latin cribs. A million young Americans are turning back to school. The teachers are in trouble, too. That sudden sound which sweeps through the late summer air is not the soughing of the first winds of autumn; it is the sighing of the pedagogues as they turn back again to their beloved labors.

Shakespeare, you remember, spoke of the boys "creeping like snail unwillingly to school." I have seen Shakespeare's school house, and I know just how he felt. It wasn't much to look forward to. And Shakespeare, with all his uncanny wisdom, could scarcely have imagined the schools of our time, with their libraries and laboratories, their shops and stadiums, their gymnasiums, auditoriums, theaters and playing fields. He could not have foreseen the organization, the variety, the equipment, the interest and excitement of the modern schoolhouse. To such schools as these no sensible boy will "creep unwillingly."

Yet I suppose most of you are kicking about it. You think you have a pretty tough time. It certainly is sad about you. Think of it,—you have to sit in school nearly five hours a day and work for some of them, with no holidays except Saturdays and Sundays, Thanksgiving, Christmas, Easter, Washington's Birthday, Columbus Day, Armistice Day, Flag Day, Mother's Day, Father's Day, Sister's and Brother's Day, and all next summer. It certainly is a rough life.

Well, we have to go through with it, so we might as well see what it is all about.

Maybe you wonder what I know about schools and schoolboys. Well, in the first place, I was a boy myself once, despite the two grey hairs on the northwest corner of my brow, and I have never quite got over it. Secondly, I have a flock of boys of my own. Thirdly, I have been a school teacher myself. For fourteen years I knew the taste of chalk and labored to teach the young idea how to shoot. Looking back I can see that I didn't teach the boys much, but they certainly taught me plenty.

I used to try to convince the boys that school was a mighty important thing to them, and that they should rightly be grabbing all the good from it they could. They didn't believe me, of course. They figured that it was just teacher talk, and that I was trying to excuse myself from blushing like an amateur burglar when I collected my monthly check. Yet now that I am a few years away from the school room, I still feel the same way about it. And maybe some of you will listen to me now.

It isn't what you learn in school that matters. I'm talking, you understand, to high school boys, and not to the older students whose fathers are working their way through college. You may not believe it, but ten years from now you will be able to put all that is left of your high school education in a penny notebook. All your history dates will be scrambled, all your algebra and geometry will be piled up in a heap, all your Latin and French and Greek will be addled. You will vaguely remember a surprising number of things that ain't so, and you will forget practically everything that is giving you headaches and a passing grade today. I've been through it, and I know. I was a wow at Trigonometry, for instance, but when it comes to triangulating a piece of linoleum so that it will fit under the kitchen sink, I'm simply sunk. All I remember about history is that there was Charles the Great and Alexander the Great and Louis the Great and Peter the Great, and that America was discovered in 1492. When it comes to Physics, I recall that there is positive electricity and negative electricity, and that the former is cheaper but rusts easier. I took two years of Chemistry, and still remember that if you drop a piece of sodium into the sink it splutters gorgeously and so does the Chemistry teacher. I remember considerable Latin, but that's because I taught it. Most men who have taken four years of Latin remember only one thing about it.—that the motto of the United States is "E Pluribus Unum", and that it means "In God we Trust."

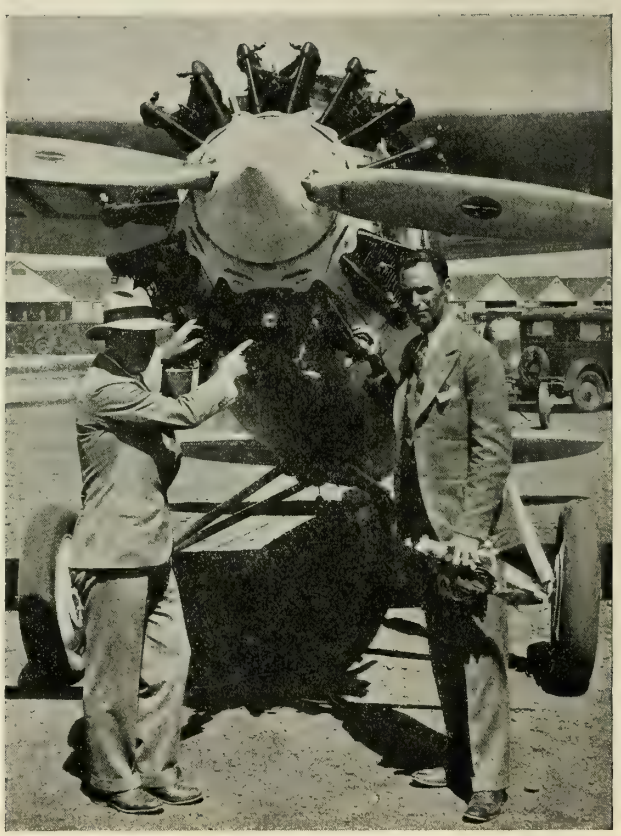
So I feel for you fellows, a little, when you ask what's the use. For the most part I can't tell you, and neither can anybody else. All I can tell you is that education is the best experience of the past boiled down for your use, so that out of it you may fashion the future. And furthermore that the principal job of the school is not to teach you facts and figures, but to train you in the trick and habit of using such things in your own business.

One of my boys is six years old. As far as he is concerned the world and all that's in it are about three years old. Back of that he remembers nothing and knows nothing. He takes the world as he finds it, and is neither surprised nor impressed by it. He sees that the movies move and automobiles run and airplanes fly and radios squawk, and it's quite all right with him. He knows already that that is what they are supposed to do. As a matter of fact, he is much more excited by a real live goat than by a 200 horse power radial engine or an endurance flight half way around the world. A katydid caught in a milk bottle thrills him far more than a handful of electrons caught and harnessed in a vacuum tube. He lives in the present, and doesn't concern himself with the past nor worry about the future.

But before long he will be going to school. I shall hand him over to a score of school teachers, who will try to unfold to him all the ancient wisdom of the world. They will show him not alone what has come to pass but how it has come to pass; they will teach him to retrace the paths of time; they will give him his heritage, which has come down to him through countless generations of men. They will teach him to honor the slow *(Continued on page 616)*

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PERSONAIRLITIES



by Caldwell

PILOT JACK LAASS, well-known West Coast educator, now holding a professorship with Mutual Aircraft Corporation, suggests a good way of educating people to use airplanes safely; only trouble being that his pupils have to be carried away after the lesson is over. Jack got a call to fly to Bakersfield and pick up Ruth Elder, who was playing Pantages Vaudeville, and fly her and her publicity man and A. J. Edwards to Los Angeles, so the unwashed multitude of that charming city could get a peek at Ruth. Jack, ever eager to rush to the aid of beauty in distress—and anyone in Bakersfield may be considered in distress—got there in 80 minutes after getting the call—pretty good for 135 miles.

"They were only slightly impressed with my quick arrival," writes Jack, "and were more concerned with the fact that I would not allow them to put a siren on the wing strut of my ship. I noticed they had quite some baggage, but gave no thought to it until coming over Los Angeles, which I had been given strict orders to circle a number of times, after picking up two other ships that were to act as escort and fly a tight formation. I picked up my escort and flew over the city. Happening to look back to the rear seat where A. J. Edwards and Mr. Publicity Man sat, I saw Ruth's Pub. Man with a bomb in his hand, with a long fuse—and him trying to light the fuse with the end of his cigar! He was nervous, shaking, and was having trouble to make the thing ignite; while I hollered at him to throw the thing out, light or not, and not to try any more of that stuff or I would come back there and get him. Hell! I couldn't leave the controls with the ships on either side tight against me; so all I could do was to look back and shout at him as he vainly attempted to light matches to start the fuse. He had the fuse, a long thing, all coiled up in a ball in the palm of his hand as Ruth, right back of me, said, 'I don't like that at all!'

"Edwards should have known better, but apparently didn't know the danger we all were in if that damn thing blew up in the cabin instead of being thrown out. It would wreck the ship, blow off the wing, or at least set fire to the gas, if the tanks were blown open by the detonation. I turned front to keep straight in formation when I heard a *bang!* Instantly the whole cabin was filled with smoke so stifling I could scarcely think. I got one lung full, but managed to open the side window as I slipped hell out of the ship—all thoughts of formation gone. The fuse had blown up, and the bomb lay sputtering on the floor as Edwards reached down and threw it out the open window on the left side. It exploded about two feet outside of the window, and we felt the concussion inside the ship. The slip cleared the cabin of smoke—only to allow us to see flames sweeping up the side of the ship, inside the cabin, which was lined with plush. It burned quite merrily until I got the old Pyrene on it, letting the ship go to hell for a second. Edwards took the Pyrene as I straightened the ship up again, while the Pub. Man slumped down in his seat, completely gone. Through it all Ruth was as calm and collected as any man I ever saw who realized he was in extreme danger.

"The formation joined up again, and we circled the field while I got my towel out from under the seat to wipe the smoke and grime off our faces, so we would be presentable to the mob that waited to greet Ruth. I sat down imploring all to put on their very best Sunday smile to greet the mob. In a moment after landing we were surrounded, Ruth whisked away, and I taxied directly to the hangar, where I got out and aimed a couple of punches at Mr. Pub. Man—both of which, I am glad to state, took effect admirably. Thought perhaps I had been losing my judge of distance and the snap to my punch, for I haven't used either for a long time. But this incident proved that I still retain the old snap in the right mitt, with a smart, stinging punch in the straight left that brings results when the target needs to be straightened up to accommodate again the trusty right rifle. Well, all in the day's work of the lowly commercial pilot—so that's that."

Professor Laass is to be congratulated on his masterly handling of a difficult situation in higher education.

HERE'S a horrible situation for you, folks. For two days the little town of Quincy, Calif., situated between the forks of the Feather River, had been cut off from communication with the outside world by the torrents that roared down the Sacramento Valley and flooded the city of Sacramento. The word went forth by radio, "We have no bread—and no yeast. Help! Help!" This plaintive cry reached the kindly ears of the Fleischmann Yeast Co., a benevolent organization at San Francisco, who called upon the Golden State Aircraft Co. of Oakland to make a flight to Quincy with 50 pounds of yeast. "Who will carry the yeast to Nome?" shouted the head of the Golden State Co. "I will," replied the bold pilot, D. A. DiFiore, seizing his helmet and goggles and leaping into his plane with all the mad abandon that Tom Mix displays in leaping aboard a horse. Then, through clouds, fog, and snowstorms, the bold lad forced his way over the Sierra Nevada Mountains—while six other planes carrying supplies to the marooned town were forced back by the weather.



D. A. DiFiore

In reporting this incident in the life of DiFiore, I have a shrewd suspicion that I am being made a victim of the publicity department, either of the Golden State Aircraft Co. or the Fleishmann Yeast Co.—or even of the Alexander Eaglerock Co., whose plane made the flight.

AFTER eleven years' service in the Army Air Corps, Lieutenant Leslie P. Arnold, round the world flier, has resigned from the Service to open an $80,000 auto laundry and service station in Long Beach, California. While we all wish Lieutenant Arnold the very greatest success in the business world, we cannot help but regret that the Army Air Corps has lost the services of this fine pilot and gallant officer. For while the United States has hundreds of thousands of good business men who are capable of running an auto laundry, it has all too few pilots who are capable of performing such splendid work in the interests of aviation as Lieutenant Arnold has performed. But, after all, how can we reasonably expect a man like Arnold to sit down tamely for years and years, waiting for a promotion which would not come until he was a middle-aged man? Before the Great Omnipotent Ooms of the Army decide to give the Air Corps the separate promotion list that it deserves, many other fine experienced pilots will have thrown up the game in disgust, choosing instead the more lucrative auto laundry, or—who knows?—perhaps even a mere Chinese laundry.



Lt. Leslie Arnold

THAT pleasant pilot with the big flock of initials—D. deR. M. Scarritt, but lately Chief of the Air Regulations Division, Department of Commerce, has resigned to accept a position with the Transportation Indemnity Company of 11 South William Street, in the wicked city of New York—where any bills will find him. I understand

(*Continued on next page*)



VALSPAR PROTECTION

FLY in the tropics, over the frozen wastes of the north or through the moisture-laden air of the seaboard. Fly through any atmospheric or climatic condition. Valspar will stand the test.

Extremely elastic, Valspar withstands the vibration of powerful motors and sudden changes of temperature that cause ordinary varnishes to crack and chip. It keeps the wing and fuselage surfaces taut, and protects wood, metal and fabrics from the elements. No amount of rain, snow or ice can harm Valspar because it is the only varnish that *never* turns white!

Because of these qualities, Valspar has been used to protect planes since the earliest days of airplane manufacture.

For those who prefer a lacquer finish and the advantage of its quick drying, we supply Nitro-Valspar — the modern all-lacquer finish.

VALENTINE'S VALSPAR
The Varnish That Won't Turn White

Valentine & Company 386 Fourth Avenue, N. Y

(*Continued from preceding page*)

that Scarritt resigned from the Department because the strain of reading pilots' applications proved too great to be borne. For instance, one of them, upon being asked what meteorology was, wrote: "Meteorology is the study of aviation instruments—you know: meter meaning something like a gas meter." No, I didn't make that up—that was a real answer. Of course, even a very strong man can stand only so much of that sort of thing, especially if he is a member of the Quiet Birdmen, which alone puts a fearful strain on the constitution, every Monday night.

Scarritt entered the Army Air Service in 1917 for the purpose of defending the homes of this great land from any possible attack by the late enemy. And if any misguided German had attempted to storm any home around Camp Dick, Payne Field, or Rockwell Field, it would have gone hard with him indeed. For Scarritt and his Jenny were right on the job at those points, scouring the country round about, constantly on the watch for enemy aircraft. Need I add that the German flyers, evidently advised by their Secret Service of Scarritt's activities, never bombed a single home around either Payne Field or Rockwell Field.

HOW many of you remember the old Newport News Flying Field of 1916 where so many learned to fly before they joined the R.N.A.S.? Now the field is abandoned, the R.N.A.S. is engulfed in the Royal Air Force, and most of the men in the accompanying group picture have gone West. Charles Foersch, Chief Mechanic, Buffalo Airport, who is No. 14 in the picture, identifies some of them. Do you recognize any of the others?

No. 1 is Captain Tom Taylor, after whom Taylor Field, Oklahoma, is named. He was killed in a crash. 2 is Roland Rohlfs, now doing night-flying, I believe. 3, David McCauley, killed in a crash at Boston. 4, Fred Zimmer, killed in crash at Buffalo. 5, Steve McGorden, killed at Newport News shortly after this picture was taken. 6, Victor Carlstrom, also killed. Carlstrom Field was named after him. Louis Krantz, 7, killed in an accident. Major Thomas Baldwin, 8, died a natural death in Buffalo. Steve Osborn, 9, is still flying, though I don't know where. Bert Acosta, 10, accompanied Commander Byrd on his flight to France, and is still going strong. 11 is Stewart Cogswell, now pilot for Mr. Vanderbilt. 12, Charles Pond, son of Rear Admiral Pond, is still flying. 13, James Honer, is now in the aeronautical business in Buenos Aires.

Aviation took heavy tolls of lives in those days—less than twelve years ago. We have to see a picture like this to realize the enormous strides in the direction of safety that flying has taken in those few years.

HARRY ROGERS, the eminent surgeon who puts new glands into old Seagulls at his hospital on Curtiss Field, put in a good winter at Miami, where, in only three days, he and his hard-working pilots carried 1,800 Shriners into the air for a view of Miami. Now, those 1,800 Shriners are, for the most part, influential business men of this country; and most of them never had been in the air until Harry Rogers or his boys took them up for a sane and sensible flight, minus stunts and foolishness. Most of those men—and I repeat that they are men of influence in their communities—came down from their flight with a personal experience that proved to them that flying was a very pleasant and enjoyable way of seeing a city, and not a breath-taking hurtle through the air that scared the daylights out of them. Last week I watched a pilot flying at a field near New York, and his one ambition seemed to be to so thoroughly terrify his passengers that they would admire his daring—but would not return for a second dose even though they had paid for a stunt flight in the first place. Now, I submit that Harry Rogers, giving those 1,800 influential citizens a good quiet flight, where they would feel perfectly safe and comfortable, was doing more good for commercial aviation than will be done by all the stunt passenger carriers in the country during the entire year, even though they loop and roll and spin themselves into an even more muddle-headed condition than they are in at present. My suggestion is this: Stunt all you want to by yourself; but when you have a passenger, let him sit there and look at the scenery—you're more apt to get him back for a second look.

MERRY doings in the Al Smith district, as reported by Bill Dunlop, distributor of Wacos in Rochester, N. Y.; "Rochester has a new Ace of the name of Roy Du Val; he has just put two more planes out of control and commission. One of these planes was mine. And Otto Enderton, an old Mail pilot of New Orleans-Pilottown fame, had the misfortune of having a student run over the tail of his poor little Waco 9 with an OX Standard. The Standard escaped uninjured, but the Waco looked like a crow that had his tail caught in a steel bear trap. Oh yes—the same day I knocked half my landing gear off on a take-off from a rough field. The following landing was pretty good if I do say it myself—just a broken prop."

LEE R. WALLACE is Vice President of Ozark Aviation, Inc. of Joplin, Mo., where he has been flying for the past five years. Now he has the agency for Travel Airs and Driggs Darts, and operates the Joplin Municipal Airport, on which they have erected hangars, office buildings, and waiting rooms. In the first thirty days of operation he sold six Travel Airs. Allen E. Lanpher, Sec. and Treas. of the company says, "We feel like the airplane business is going to go over big in Joplin." It ought to. I have been in Joplin, and consider the fastest transportation out of Joplin is none too fast. When faster planes are built, Joplin will use them.

(*Continued on next page*)



A group of pilots and students at Newport News, Va., a dozen years ago.



U. S. S. Los Angeles flying over Panama Canal Zone

THE name Goodyear has long been coupled with aerial science.

Goodyear balloons have made hundreds of flights to assist man's exploration of space.

Goodyear has pioneered in the development of airplane tires and has won the confidence of pilots everywhere.

Goodyear has constructed 29 airships, and has furnished parts for 86.

Goodyear observation balloons sentineled the allied front.

Goodyear has developed and perfected many items of rubber for airplane equipment, notably a safety gasoline tank cover.

Five years ago Goodyear obtained from Europe patent and process rights to gain dirigible supremacy for America.

Goodyear men have always given unstintingly of toil, skill, and even life, to the progress of aviation.

Goodyear stands ready to do anything within the power of the world's greatest rubber company to further the commercial success of both lighter- and heavier-than-air operations.

"AMERICA MUST BE FIRST IN THE AIR"

P. W. Litchfield

GOODYEAR

Copyright 1928, by The Goodyear Tire & Rubber Co., Inc.

(*Continued from preceding page*)

A THREE day search for three fifteen-year old high school boys of Miami, who started out on a canoe trip on Biscayne Bay, was ended when Pilot A. B. Chalk, flying his Waco Seaplane, sighted one of the bodies near Virginia Key, floating about ten feet below the surface. After securing the body, which he was unable to transport, Chalk returned to Miami and secured help. On his next trip he brought back the body and also located the two others, which were then secured by searchers in motor boats.

A. B. Chalk learned to fly in the Spring of 1911, in a Benoist pusher equipped with a 6-cylinder two cycle Roberts motor. His instructor was Tony Janus. Most of the flying was done on the Ohio River, near Paducah, Kentucky. They flew for half an hour, then worked six and a half days on the motor before they could go up again. This was so tiring that Chalk in 1916 joined



A. B. Chalk, T. C. Chalk and W. A. Patten

the Marines for a rest, and slept soundly until 1918, as the Marines at that time had not been annexed by a Nicaraguan political party. He began to see, however, that it would be a long time before he became a general—and after looking at Smedley Butler for awhile, I don't know that he wanted to be one anyhow. So he got out and started a flying school in Miami, where they get a lot of high-flyers in the winter; and he's been there ever since, so he's pretty well sun-dried by now. He has lost three ships from hurricanes (though I believe they are only known as heavy breezes in Miami) but has never had a crash, so Johnson Wright tells me. He's a good, conservative flyer and takes no unnecessary chances, and expects to be with us for quite some time. I met him while I was flying to Haiti last Fall, and very kind he was to me, too. Any of you fellows flying seaplanes down the East Coast will get a warm welcome from this old leatherneck of the air; and if you happen to have been with the Marines, he'll never let you leave Miami.

VAL MINER of the Elmira Airport invited me up to the Air Meet, but I couldn't go, as I was stuck in a hotel in Detroit. My coat got caught in a door, or something, and I just couldn't get out. I wired that George Haldeman and I might fly there next day—though it just happened that we couldn't even move from the hotel—and Val wired right back. "Why not get George to come here with you Sunday? Have several old timers who have put in years of practice at your great indoor sport. You can put away as much as you want to. Newspapers will have full accounts of flying so you will not have to leave your hotel room. All tomatoes, sauerkraut juice, and bromo seltzer furnished by Jimmy Walker ——the rest of the Walker family will assist in other ways." Well, I'd have gone, only George needed the rest, so we slept for a day or so. Those hotels are so tiring!

THE laddie posing for his picture hanging onto a prop and with one foot in the air as though he was about to walk up on a wing, is Pilot Lee Flanagin, Chief Instructor of the Aero Corporation of California. He is as Irish as a barrel of pork marked "Dublin," and was born in County Cork. He has pulled quite a few in his time, too, and you should see his eyes sparkle as each one comes out with a pop to remind him of home. I expect to fly out his way in September, when he may pull one for me. And he needn't pull it in the Polly-Anna Tea Shop, either, where the boys of the Professional Pilot's Association gather to eat muffins and crumpets. I got a letter from Palmer Nicholls, the Secretary, and he said that when I was in town the boys would meet at the Bull Pen Inn.



Lee Flanagan

HASN'T he got a kind face? He looks like an earnest young evangelist just begging the rough-necks on the back benches to come right up front and kneel down at the mourners' bench and have a good cry. He's Pilot W. P. McFail of Fargo, N. D., and shoves the Fairchild planes from Fargo to Minneapolis for the Mid-Plane Sales and Transit Co., who have that run.



W. P. McFail

I met McFail at Fargo last month, when I flew out there and tagged along back to Detroit with the National Air Tour, just to help the boys in spiritual matters. I flew the B. F. Goodrich Company's new Fairchild, with my old pal, Henry Wacker, the demon tire salesman of Akron. And what a time we had—I'll get around to it in another place. But now I must tell you about McFail. Back in 1923 he was doing wing-walking down in Texas, a state made famous by Texas Guinan. Byron Good and M. M. Merrill were the bold pilots who were advancing aviation by taking wing-walkers up to a height where they could break their necks more completely than they could by tripping over chairs in the Statler. And the bird they took up was this McFail. In six months of that work he developed a grip so powerful that he could take two strange wildcats in either hand and make them purr at each other. The only thing that could have jarred that boy loose from a strut was an explosion—and not an ordinary explosion, either. At Wilson, Oklahoma, in 1923, he finally got jarred loose from wing-walking, and decided that seats were put in airplanes for people to sit in, and that wings weren't designed originally to go for a stroll on. The jar came like this: He was standing on the top wing, with his feet in the loops. Merrill was flying the ship at a fairly low altitude and had dived to get up speed for a loop, when the motor quit cold. As McFail scrambled down into the cockpit, it occurred to him that if the motor had quit when the plane was on top of the loop, and with him hanging by his toes, that he would have been in a terribly embarrassing position, even allowing that the toes held, which, with what he knew of his toes, he couldn't allow. Before the ship had even landed, another wing-walker had been cured, absolutely, and had decided to become a pilot. Now he sits in the Fairchild and looks calmly through a flock of glass at the passing scenery.

SEE the brave boy sitting right in front of the whirling propeller on the little skooter! Notice the happy smile on his face, indicating his confidence in homemade



Lawrance Oberle of Hammond, Indiana

props—for he made it himself! The fearless and merry gentleman is Lawrance Oberle, of Hammond, Indiana, partner with Gus Oman in the development of this type of craft, which, by the way, has great possibilities. But not with the propeller so near that bit of chicken-netting on which Lawrance and Gus depend for protection. Suppose they should lean back too far! These boys aren't pilots, but they're bolder than any pilots I ever saw. Next time somebody mentions the dangers of flying, you just get out this picture and say, "But look at Gus and Lawrance!"

Seriously though, these boys with very little spare money and no support from anyone are working away at this experiment and will get somewhere with it—possibly into an argument with my friend, George Birkbeck Post, whose slogan, "Nothing on the bottom but paint." has startled the world and delighted Berry Brothers.

Sunshine

makes good weather for flying, though it's hard on the finish

But——

here is a clear lacquer finish that *baffles* the ultra-violet sun rays



Other Murphy Aircraft Finishes

Aircraft Colored Flexible Finishing Lacquer

Aircraft Super Spar Varnish

Aircraft Sanding Primer Red

Aircraft Bronze Mixing Spar

Aircraft Enamels, Stains, and other aircraft finishes.



MURPHY FINE FINISHES

Famous for 63 years among architects, master painters and makers of products requiring a fine finish

SURFACE finishing on aircraft has been a hard nut to crack. Aside from exposure to rain, wind and the destructive force of the sunlight's ultra-violet rays, the aircraft surfaces are subject to great vibration and to stress and strain and flexing. Until recently it has been difficult, if not impossible, to get a finish that will stand up under the extreme conditions of flying.

A remarkable product — Murphy Aircraft Clear Flexible Finishing Lacquer—has been developed, which answers completely every demand that can be made of an aircraft finish. We give here briefly a few of the high spots of this unusual product.

It is the only lacquer we know of that arrests the ultra-violet rays of the sun. Sunlight destroys most finishes, but it strengthens this one. It resists the treacherous workings of aircraft surfaces.

It dries to a good gloss as a finishing coat over colored spray lacquer, or mixed with it. Mixed with aluminum powder it forms a lasting, durable finish. Metallic powders actually "leaf" in this lacquer.

Murphy Aircraft Clear Flexible Finishing Lacquer develops a surface so glassy smooth that it is extremely easy to keep clean.

We urge that you learn the full facts about Murphy Aircraft Clear Flexible Finishing Lacquer. Either try out this unusual product right now and experience its remarkable properties at first hand, or send for further information.

MURPHY VARNISH COMPANY
NEWARK CHICAGO SAN FRANCISCO MONTREAL

Murphy

Aircraft Clear Flexible Finishing Lacquer

FOR PERFORMANCE



Above—Some of the boys of The L & H Aircraft Corp. pose in recommendation of HyViS.

Left—Snapshot of one of the L & H planes at Murray Bay during the recent rescue of the Bremen flyers. The planes were lubricated with HyViS and Mr. Mather said: "The zero temperarure forced pilots of the other planes to pre-heat their oil. Our pilots found it unnecessary to even drain the HyViS at night and encountered no trouble in starting their motors and getting good pressure."







Right—One of the fleet of Ford Tri-Motor Ships operated by Maddux Airlines, Inc. showing Jack Wiles, Foreman, W. E. LaFollette, Gen. Supt., Eddie Jakubia, Chief Mechanic, and Larry Fritz, Chief Pilot.

The insert shows the mechanic at Dearborn filling the motors with HyViS just before Chief Pilot Larry Fritz hopped off for Los Angeles.

AND PROTECTION

Operators from Coast to Coast Specify HYVIS

IN all types of motors, under a wide variety of conditions, HYVIS Aero Oil is more and more forcefully demonstrating its ability to give better protection to the modern aircraft motor.

From down east comes the following statement from The L & H Aircraft Corp. of Hartford: "After careful tests of various oils in different aircraft motors under all weather conditions, we have adopted HYVIS. As distributors of five makes of planes, Challenger, Fairchild, Monocoup, Stearman, and Swallow, we owe it to our customers to use and recommend the oil we believe will give them the best lubrication."

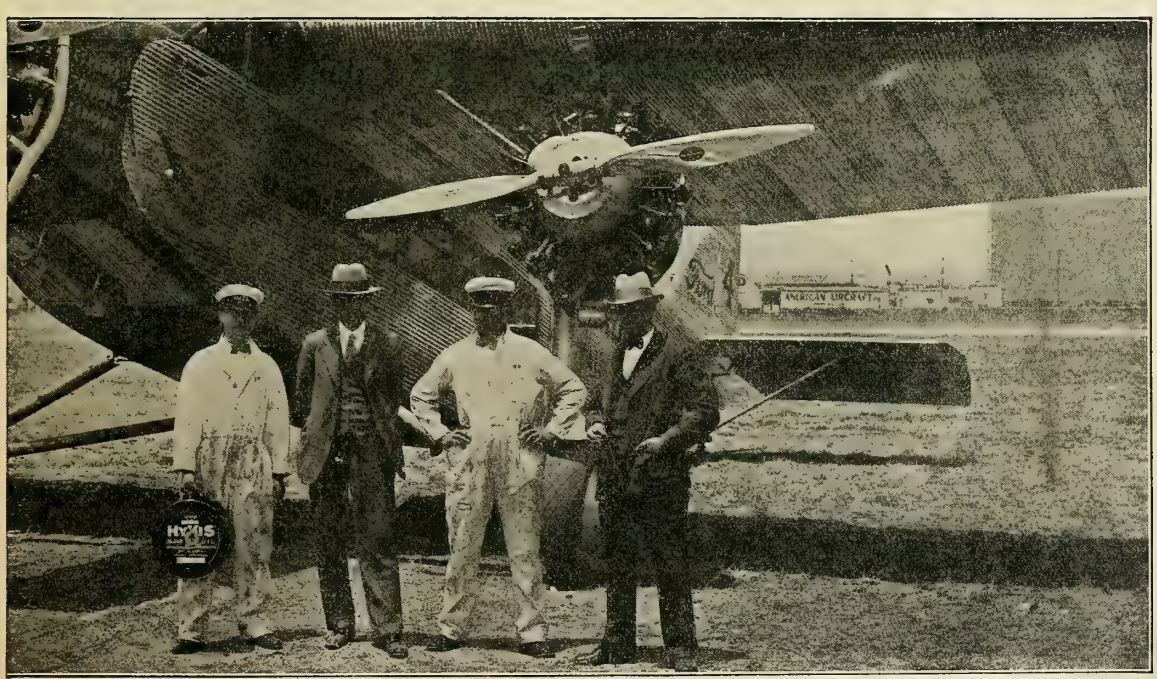
Three thousand miles west, at Los Angeles, HYVIS is doing an equally fine job for the Maddux Airlines, Inc. in their big Ford Tri-Motors.

Here are the words of Chief Pilot Larry Fritz: "The exceptional lubricating qualities of HYVIS were recently demonstrated in a fly-away delivery of a Ford Tri-Motor ship (shown below). The three Whirlwind motors were filled with 15 gallons of HYVIS at the Ford Airport. After 29½ flying hours from Detroit to Los Angeles the oil was drained and found in excellent condition. The oil consumption per motor for the entire trip was about one-half pint per flying hour. No oil was added and a uniform pressure of 60 lbs. was maintained."

These two cases are indicative of the preference that outstanding operators are showing for HYVIS Aero Oil. It is the finest distilled Pennsylvania Lubricant possible to produce and ranks prominently among the dependable lubricants now available. It should be preferred for its first-cost economy in lowered consumption, and long-run economy through better protection to motor and bearings.

We welcome comparative tests with any other oil.

Fred G. Clark, Inc., Cleveland. Established 1882. Chicago, Minneapolis, Los Angeles. Refineries, Warren, Pa. Distributors at all Principal Points.



TECHNICAL

BOEING 12 PASSENGER Model 80 TRANSPORT

THE new Boeing plane, Design 80, is a commercial airplane designed to accommodate twelve passengers, and at the same time provide space for carrying 1,500 pounds of mail, express or baggage.

The passengers' cabin is 73½ inches high, 63½ inches wide and approximately 14 feet long. The passenger capacity of this airplane could be increased from twelve to sixteen or twenty depending on the required size of the compartments for baggage and mail.

Seats are arranged in four rows of three each, two seats together on the left of the aisle with a single seat on the right. These seats, upholstered with springs and leather, and provided with reclining backs adjustable to four positions, are designed to give individual comfort. Metal racks are provided for hats and small parcels.

Windows are large and unobstructed by any of the structural members of the body. Non-shatterable glass is used and the windows can be partially or completely opened.

Two dome lights and shaded wall lamps opposite each row of seats provide illumination for the cabin at night. The wall lamps are provided with individual switches.

Mounted on a panel at the forward end of the cabin, are a large altimeter for indicating altitude above sea level, an air-speed indicator, a clock and a bulletin board for a large map of the route flown and information of interest to the passengers.

In a compartment forward of the passengers' cabin is a small buffet from which coffee and light lunches can be served. Aft of the main cabin is a large and well-appointed toilet room. Provision is made for running hot and cold water. A 120 watt electric heating unit, thermostatically controlled, keeps the hot water at a temperature of 180 degrees F.

Forced ventilation and heating for the cabin is provided. This combined with the fact that the entire cabin is insulated and sound-proofed, will make the cabin comfortable at all times.

The pilot's cockpit, in the nose of the fuselage, is designed to give the operating personnel protection during all kinds of weather. Particular attention is paid to the visibility during bad weather. Easily operated windshields of non-shatterable glass are provided in the front and on both sides. There are two sliding celluloid doors above the cockpit through which easy ingress and egress are possible.

Communication with the passengers' cabin is made by means of an aisle past the baggage compartment. There is a door at either end of this aisle.

The baggage compartment is forward of the passengers' cabin and the door to the same is on the left-hand side of the fuselage. This compartment has a capacity of 90 cubic feet.

Instruments consist of: compass; bank and turn indicator; climb indicator; two airspeed meters; two altimeters; two clocks; three tachometers; three gas pressure gauges; three oil pressure gauges; three oil temperature gauges.

The following controls are all operated from the pilot's cockpit: primer; electric inertia starters and boosters; shutter controls to regulate the oil temperature; hot air intake controls; fire extinguishers individually controlled; landing lights individually controlled and retractable within wings when not used; mechanical brakes operated by a single lever giving selective braking effect to both wheels; two parachute flares.

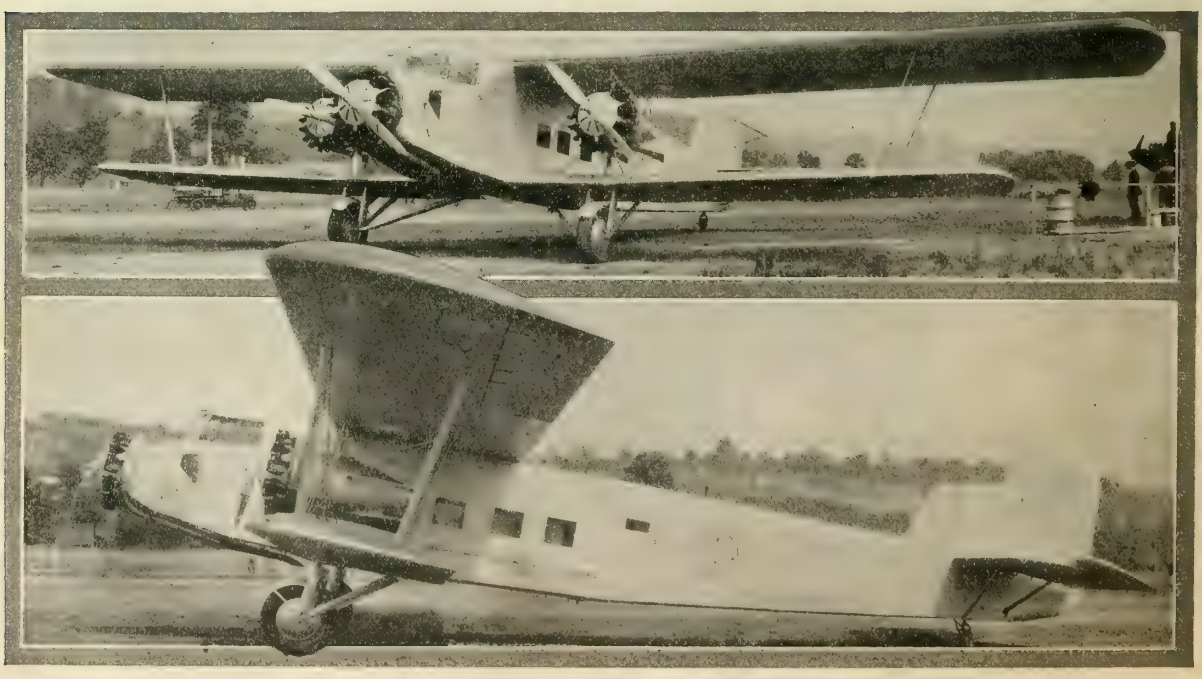
The fuselage structure is of welded steel tubing with fabric covering. The wings have spars and ribs of duralumin, fabric covered. The N-22 wing section is used.

Wheel control is provided. The pedals for rudder control are adjustable for two positions. Friese ailerons with differential control assure easy handling in spite of the great span of the wings.

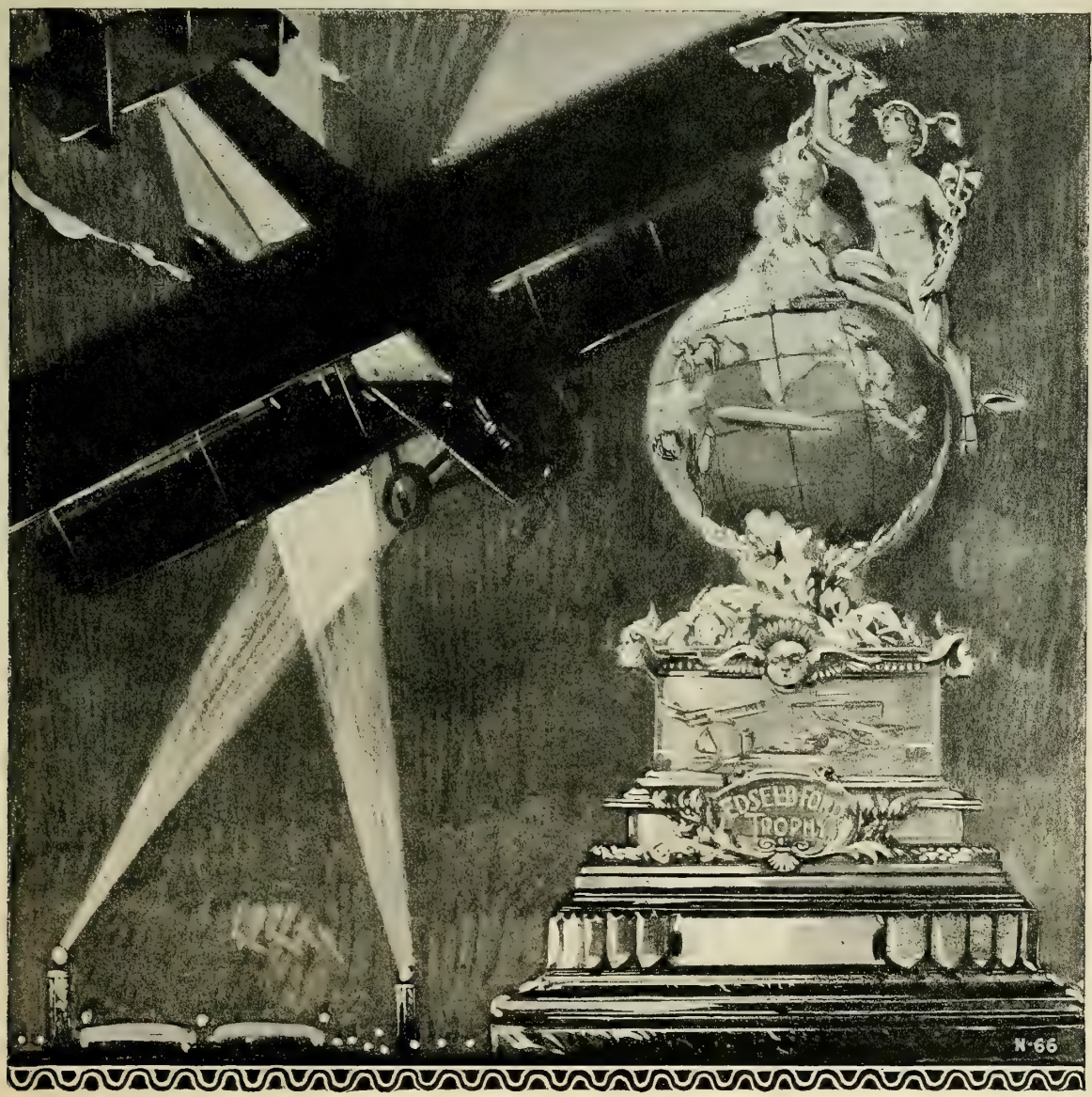
Electrical equipment consists of a generator, two batteries, control box, volt meter, ammeter, three electric inertia starters and a booster magneto system.

The treadle type oleo landing gear uses two oleo struts for each wheel, the wheels traveling in a fore and aft direction when landing. The wheel tread is 218 inches; wheels 44 inches by 10 inches.

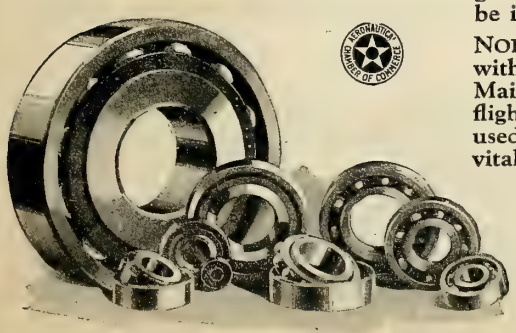
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Safety and luxury are paramount features of the triple-engined Boeing twelve-passenger Transport



Plain Talks on Fine Bearings



No. 3—Aviators are honored—and valued—for their achievements. Pilots are ranked for their reliability and resourcefulness. Shall the same standards be applied to the planes they drive, and to the mechanisms which power and guide them? Or shall price decide—and costly failure be invited for the sake of a small saving in the first cost?

NORMA-HOFFMANN Precision Bearings are inseparably linked with the achievements of Lindbergh, Byrd, Chamberlin, Maitland, Hegenberger. In equipping for the epoch-marking flights of these master-flyers, the price of the bearings to be used was not considered. Bearing dependability was the vital thing sought. NORMA-HOFFMANN Precision assured it.

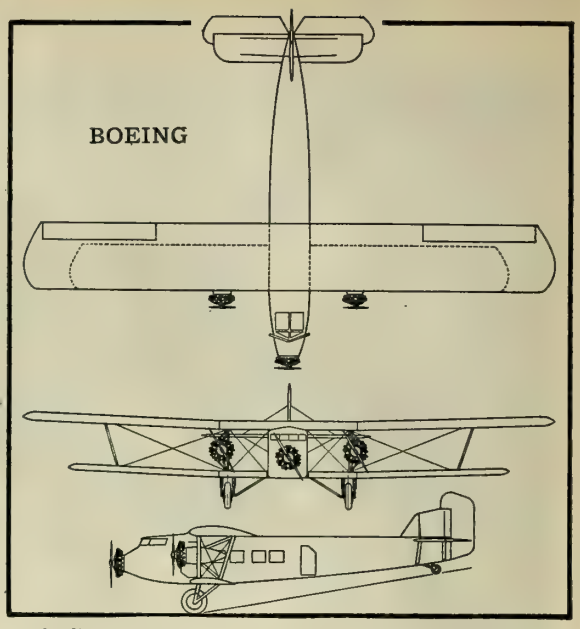
NORMA-HOFFMANN BEARINGS CORPORATION

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS



Looking forward in the cabin of the Boeing Transport



Outline drawings of the Boeing Transport Model 80

(*Continued from preceding page*)

The tail skid wheel has a hard rubber tire and shock is taken up by an oleo gear and spring system.

A brief description of the Model 80 Transport was published in the November, 1927 issue of AERO DIGEST while these planes were under construction. We are now able to give additional specifications and performance figures, as follows:

Performances (with full load)

High speed	128 miles per hour
Landing speed	55 miles per hour
Rate of climb	700 feet per minute
Climb in 10 minutes	5,700 feet
Service ceiling	14,300 feet
Take-off run	835 feet
Take-off time	12 seconds
Wing loading	12.5 pounds per square foot
Power loading	9.69 pounds per square foot

Dimensions

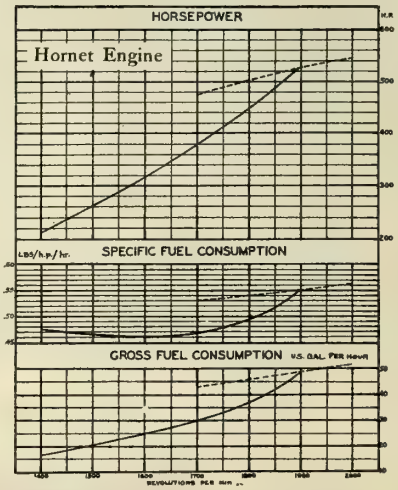
Length overall	55 feet
Height overall	14 feet 8 inches
Wing span, upper	80 feet
Wing span, lower	65 feet 8 inches
Chord, upper wing	120 inches
Chord, lower wing	84 inches
Dihedral	2 degrees
Incidence	None

Areas

Wings including ailerons	1,200 square feet
Ailerons	107 square feet
Stabilizer	79 square feet
Elevators	67 square feet
Rudder	36 square feet
Fin	25.6 square feet

Weights

Weight empty	9,229 pounds
Useful load	6,045 pounds
Pilot	180 pounds
Fuel (340 gallons)	2,040 pounds
Oil (27 gallons)	190 pounds
Actual pay load	3,637 pounds
Gross weight loaded	15,274 pounds



Power curves of the Hornet engine Dotted lines show full throttle; full lines indicate the propeller load

Power is furnished by three Pratt and Whitney "Hornet" engines each delivering 525 h.p. at 1900 r.p.m. The "Hornet" was described in detail in the January issue of AERO DIGEST.

DESIGN 83

HAVING collaborated with the Bureau of Aeronautics in a detailed study of the special requirements of carrier fighters, the Boeing Airplane Company presents its new light single seater fighter, Design 83. This plane is intended primarily for operations from the United States Navy's aircraft carriers, Saratoga, Lexington and Langley. Its high speed in the air is an important factor in fighting while its low landing speed is especially suited to landing on carrier ships.

This airplane, which may be used either for fighting or light bombing, is one of the smallest, lightest and fastest which the Navy has employed thus far. Design 83 is powered by a special Pratt and Whitney "Wasp" engine with a six-inch longer crank shaft. This engine is rated at 500 h.p. at 2,100 revolutions per minute.

The weight of the plane empty is 1,634 pounds.

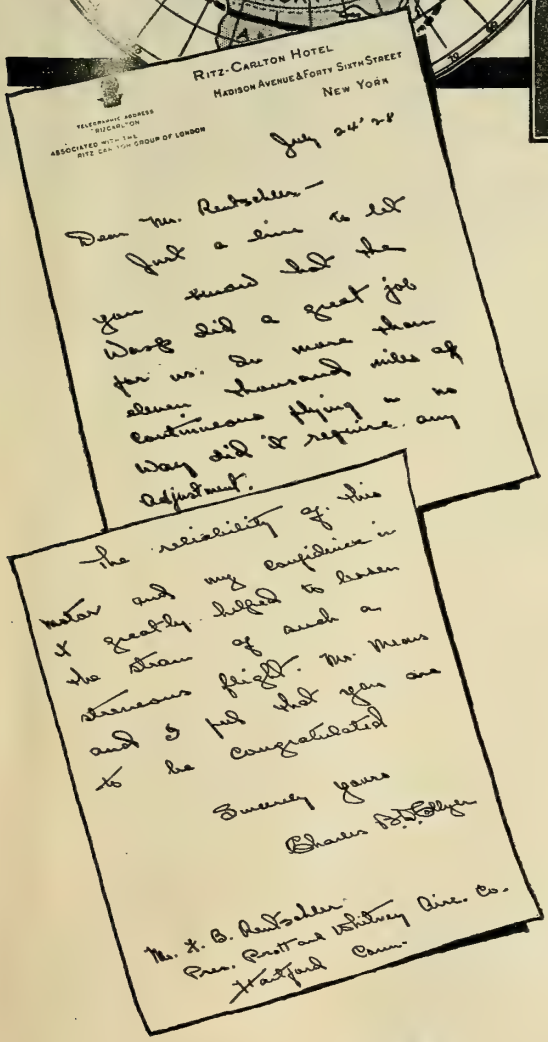
Maximum speed	182 miles per hour
Stalling speed	54 miles per hour
Climb in 10 minutes	17,500 feet
Service ceiling	29,000 feet



Boeing "Design 83," a fighting single-seater used by the Navy







RITZ-CARLTON HOTEL
MADISON AVENUE & FORTY SIXTH STREET
NEW YORK

July 24' 28

Dear Mr. Rentschler—

Just a line to let you know that the Wasp did a great job for us. In more than eleven thousand miles of continuous flying — no way did it require any adjustment.

The reliability of this motor and my confidence in it greatly helped to lessen the strain of such a strenuous flight. Mr. Mears and I felt that you are to be congratulated

Sincerely yours
Charles D. Collyer

Mr. F. B. Rentschler
Pres. Pratt and Whitney Aire. Co.
Hartford Conn.

Around The World In 23 Days

In their record-breaking trip around the world, John Henry Mears and Captain C. B. D. Collyer flew more than half the total distance travelled. In nine days flying their "Wasp" carried them over 11,000 miles without adjustment.

The fine performance of the motor is attested by Captain Collyer's letter.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

KITTY HAWK BIPLANE

THE Kitty Hawk is a three place biplane designed for a radial air cooled engine and is manufactured by the Bourdon Aircraft Corp., Hillsgrove, R. I. The fundamental design was supplied by Allen P. Bourdon. The structural designing, and stress analysis were handled by F. T. Kurt and J. E. Summers of the engineering department of the corporation. The engineering work was started November 1927 and the first ship flown in May 1928.

Since completing the first ship, six others were put into production and it is planned to increase the production rate soon.

The engine used is the seven-cylinder Ryan Siemens which delivers 96 h.p. at 1,750 r.p.m. A different engine may be installed simply by changing the engine mount and cowling. The plane has a maximum speed of 112 miles per hour, and a cruising speed of 90 miles per hour. The landing speed is 40 miles per hour, the rate of climb, 600 feet in one minute. The cruising range is 500 miles.

The ship has dual controls with the stabilizer and fin adjustable. The stabilizer is adjustable from the rear cockpit and the fin is adjustable on the ground.

The front cockpit is very accessible and exceptionally free from struts and wires that may interfere with the vision or present hazards in case of an accident. The clean lines around the front cockpit are principally due to the absence of a center section.

Due to the fact that the ship was originally designed for a radial motor, which permits a concentration of weights near the center of gravity and thereby makes for maneuverability, variations in pay load cause very slight changes in the location of the center of gravity.

With the exception of the landing gear, tail skid and tie rods, all of the steel sheet and tubing is mild carbon No. 1025. This steel was adopted principally for its good welding characteristics and it practically eliminates any possibility of using stock of an inferior quality for a field repair job.

The fuselage is made up of seamless steel tubing with welded joints. The sides, top and bottom are Pratt trusses. A noteworthy feature in the fuselage is the very few eccentricities at the welded joints.

The U.S.A. 27 wing curve is used. The wings are of wood, fabric covered. The spars are routed spruce and the ribs are made up of spruce into Warren trusses with plywood gussets, glued and nailed. Wing fittings are 1025 sheet steel bolted to the spars. The lugs for wire pulls and struts are in a plane parallel to the slipstream, presenting a very clean appearance and offering the minimum resistance to the wind. All lugs pull off the spar centers, thus eliminating eccentricities in the spars, due to wire pulls.

Wing struts and cabane are made up of streamline tubing and the stays are standard streamline tie rods; the flying stay rods are double.

The drag truss is standard square tie rods and spruce struts. The drag truss struts butt solidly against the spar thus preventing the wires from becoming slack due to shortening of the struts.

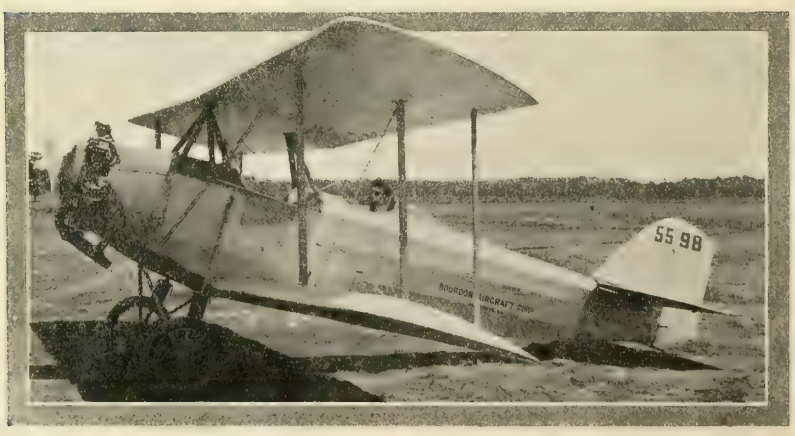
There is practically no gap where the ailerons join on to the wings. This is accomplished by means of dural fairing on the wing and a dural strip rolled over the back of the aileron making a cylindrical form which always presents a faired surface to the wind.

Ailerons are spruce with Warren truss ribs and dural trailing edges, similar to the wing construction. Ailerons are interchangeable.

Tail surfaces are of seamless steel tubing with welded joints. The elevators are both made up on a common torque tube with the horn attached in the middle, inside the fuselage.

The stabilizer is in one piece and adjustable. The adjusting mechanism is operated by a push rod directly from a lever located in the rear cockpit. Adjustment may be made through a range of from two degrees negative, to four degrees positive.

The stabilizer and fin are braced by means of double tie rods from the fuselage to the stabilizer spar and single rods from the stabilizer spar to the fin spar.



The Ryan-Siemens engined "Kitty Hawk" commercial plane

The rudder is similar in construction to the other surfaces. The fin rear spar is a slip fit in the tail post and the diagonal spar is bolted to the fuselage where it is adjustable for the effect of the propeller slipstream.

Ailerons and elevators are operated by push rods and the rudder by means of cables. Both sets of rudder pedals operate independently of each other.

The ship may be controlled from either cockpit. The stick and rudder pedals may be disconnected in the front cockpit when not being used for training or other purposes where dual control is desirable.

The gas tank is of welded aluminum and has a total capacity of 37½ gallons, ten gallons of which is in the gravity tank. The tank is constructed in such a way as to provide a main tank and gravity tank all in one. The gravity tank is in the upper part of the main tank, being separated by a bottom which also acts as a horizontal baffle plate. The tank is supported by means of steel straps attached to the fuselage members. The tank may be removed from the plane simply by removing the gas connections and two bolts which hold the steel supporting straps. The front cockpit is large enough to allow removal of the tank without disturbing any other part of the ship.

A hand pump is located in the rear cockpit for emergency use. There is a sight gauge located in the filler cap of the gravity tank and a gauge for the main tank located on the instrument panel in the rear cockpit. A three gallon capacity welded aluminum oil tank is located forward of the fire wall above the engine.

An Elgin instrument panel is installed in the rear cockpit and is made up of an altimeter, tachometer, oil pressure gauge, gas gauge, oil temperature gauge and clock, and throttles are provided in both cockpits. The engine mount is attached to the fuselage by means of four nickel steel tapered pins and lock nuts.

The landing gear is of the split type, made up of chrome molybdenum seamless steel tubing. The tread is 7 feet 4 inches. One of the noteworthy features of the landing gear is the ease with which it may be removed for repairs or replacements. The axle is welded to the lower vee struts, thereby eliminating any torsional strains that would occur in a bent axle. The shock absorbers are circular rubber discs slipped over the lower end of the compression strut which telescopes into a short length of tubing at the bottom. Rubbers may be removed or added as desired by removing the weight from the side of the landing gear on which the change is desired.

Covered wood and metal parts are given a coat of Linoil before covering. The load factors and other specifications have been in accordance with the Department of Commerce requirements.

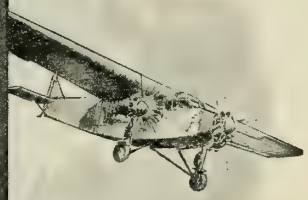
Specifications

Length overall	21 feet 11 inches
Height overall	8 feet 6½ inches
Span	28 feet
Chord	4 feet 6 inches
Total wing area	233.4 square feet

(Continued on next page)

These Leading Aircraft Manufacturers Have Selected
"The Highest Priced Bearing in the World"

NAME	MANUFACTURERS OF
AERIAL SERVICE CORP.	*Accessories*
AEROMARINE STARTER CO.	*Starters*
AIRCRAFT DEVELOPMENT CO.	*Dirigibles*
ALLISON ENGINEERING CO.	*Motors and Accessories*
ARMY AIR SERVICE	*Planes and Motors*
BELLANCA AIRCRAFT CORP.	*Planes*
BROWNBACK MOTOR LABORATORIES	*Anzani Motors*
CONSOLIDATED AIRCRAFT CORP.	*Planes*
CURTISS AEROPLANE & MOTOR CO.	*Planes and Motors*
DAYTON AEROPLANE ENGINE CO.	*Motors*
EBERHART AEROPLANE & MOTOR CO.	*Planes and Accessories*
ECLIPSE MACHINE CO.	*Starters and Generators*
FAIRCHILDS AIRPLANE MFG. CO.	*Planes*
FAIRCHILDS-CAMERA CORP.	*Aerial Cameras*
FAIRCHILDS-CAMINEZ ENGINE CORP.	*Motors*
FISHER & JACOBS	*Motors*
FLOCO—F. L. ODENBREIT	*Motors*
T. L. FRAWICK	*Reduction Gears*
GENERAL ELECTRIC CO.	*Accessories*
GILLIS AIRCRAFT CORP.	*Planes*
THE HALPIN DEVELOPMENT CO.	*Planes*
HAMILTON METAL PLANE CO.	*Planes*
KINNER AEROPLANE & ENGINE CO.	*Motors*
THE NATIONAL STEEL PRODUCTS	*Accessories*
NAUGATUCK ENGINE & MACH. CO.	*Motors*
NAVY BUREAU OF AERONAUTICS	*Planes and Motors*
PITCAIRN AVIATION, INC.	*Planes and Motors*
PRATT & WHITNEY AIRCRAFT CO.	*Motors*
SAUZEDDE CORPORATION	*Wheels*
SIKORSKY MANUFACTURING CO.	*Planes*
SPERRY GYROSCOPE CO.	*Lights*
STEEL PRODUCTS ENG. CO.	*Accessories*
CHARLES C. STICKNEY	*Motors*
STOUT METAL AIRCRAFT CO.	*Planes*
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WRIGHT AERONAUTICAL CORP.	*Motors*
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NATIONAL ADVISORY COMMITTEE ON AERONAUTICS	







For in the air certainly *nothing is apt to cost so much as a bearing that cost so little*

SKF INDUSTRIES, INCORPORATED
40 East 34th Street, New York, N.Y.

SKF

"The Highest Priced Bearing in the World"

YOU MEN who plan, build, use or *pay* for machines of any kind, remember this: It costs more to *replace* a poor bearing than to buy the best that SKF ever produced.

2100

© SKF Industries. Inc., 1928

(*Continued from preceding page*)

Horizontal stabilizer area..16.10 square feet
Elevator area.....9.25 square feet
Fin area.....4.54 square feet
Aileron area.....22.3 square feet
Rudder area.....5.25 square feet
Weight empty.....1,115 pounds
Gross weight.....1,888 pounds
Wing loading...8.10 pounds per square foot
Power loading.19.65 pounds per horsepower
High speed.....112 miles per hour
Cruising speed.....90 miles per hour
Landing speed.....40 miles per hour
Gasoline capacity.....37.5 gallons
Oil capacity.....3 gallons
Range at cruising speed.....500 miles

"HYB-LUM" ALUMINUM ALLOY

THE Sheet Aluminum Corporation, of Jackson, Mich., has recently placed on the market a balanced aluminum alloy that is fundamentally new in composition and in application to a wide variety of products, for many of which aluminum has never before been practicable. It is claimed for this alloy that it combines lightness and strength to a greater degree than any other workable product of its kind ever developed on a commercial basis. The new aluminum alloy is known by the registered name Hyb-lum.

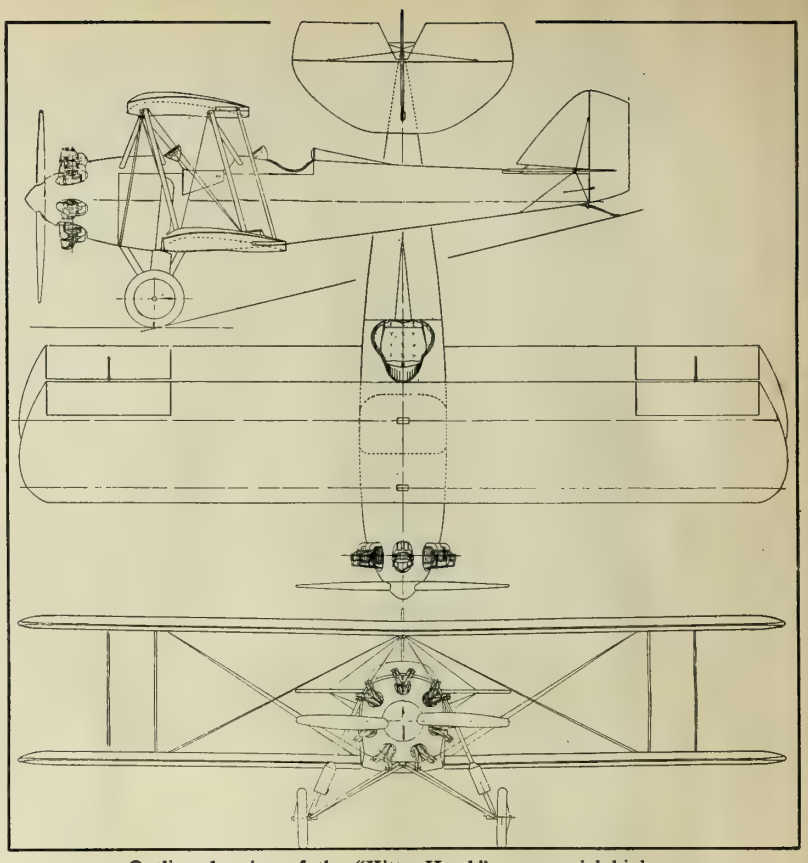
Research and experimental work on the alloy was done by Victor N. Hybinette, Jr., with the advice and assistance of his father, who is an officer of the Sheet Aluminum Corporation and an international authority on non-ferrous metals.

Prior to the introduction of Hyb-lum, the alloying elements of aluminum were chiefly copper, manganese, silicon and magnesium. Hyb-lum departs largely from these elements, employing instead nickel and the metals of the chromium group. The total addition of all heavy metals is approximately two per cent.

Among the outstanding qualities claimed for Hyb-lum are color, non-tarnishing, non-corrodibility, resistance to inter-chrystaline corrosion, chemical resistivity, welding quality, strength and plasticity, non-fatigue, low specific gravity, wide limits of temperature in heat treatment, and stability after heat-treatment even at elevated temperatures.

Hyb-lum has a pure white color, like that of silver and without the grayish blue cast of aluminum. It takes a brilliant and lasting polish. Its astonishing non-tarnishing quality may best be demonstrated by placing a polished sheet in any chemical laboratory, where all kinds of gases are present, often with a large excess of moisture. Hyb-lum is only slightly affected by the salt spray and cyclic immersion tests for inter-crystaline corrosion. It resists chemicals better than pure aluminum. It welds with gas as well as pure aluminum, and in arc welding is superior both to pure aluminum and other high strength alloys.

Hyb-lum is manufactured in four different classes—A, B, C and D—but the composition is virtually the same in all, the different physical properties as to strength, plasticity, elongation, bending qualities and workability being obtained by annealing, hardrolling to different tempers, cold-working and heat-treatment. As in its different forms Hyb-lum is actually one alloy in chemical composition, it follows that in all classifications such properties as specific gravity, and thermal and electric conductivity are alike. The specific gravity is 2.73; electric conductivity is 45 to 50 per cent of that of copper.



Outline drawing of the "Kitty Hawk" commercial biplane

Hyb-lum is produced as a heat-treated metal (Hyb-lum D) that may be used as such, obviating the necessity for users to maintain special heat-treating departments. In cases where finished or semi-finished articles must be heat-treated by a fabricator, the process has been simplified to a very large extent (Hyb-lum C). Heat-treatment of Hyb-lum consists of quenching in cold water from 900 to 975 degrees F. for a period of from 12 to 24 hours. Hyb-lum is annealed at from 600 to 1,000 degrees F. Thus it is apparent that the temperature ranges in all cases are very wide.

Quenched Hyb-lum has the qualities of the annealed alloy, in that it does not change at ordinary temperatures; it does not age spontaneously. In fact, it does not begin to age until a temperature of 250 degrees F. is reached, and the aging process is very slow up to 290 degrees F. Hyb-lum may be aged at temperatures between 300 and 450 degrees F., and after such aging is completed, in from 12 to 24 hours, the material is unchanged at all temperatures up to the annealing point. Such heat-treated Hyb-lum is remarkable for its strength, not only at ordinary but also at elevated temperatures.

While the four classes of Hyb-lum offer the usual combinations of strength and ductility in high degree, in Hyb-lum D a novel and interesting combination has been brought about. In its soft and medium states this form of the alloy has a comparatively low elongation but has 40 to 70 per cent reduction of area. In this alloy the percentage of elongation is not a measure of plasticity, and with only two per cent elongation, for example, it still retains perfect bending quality.

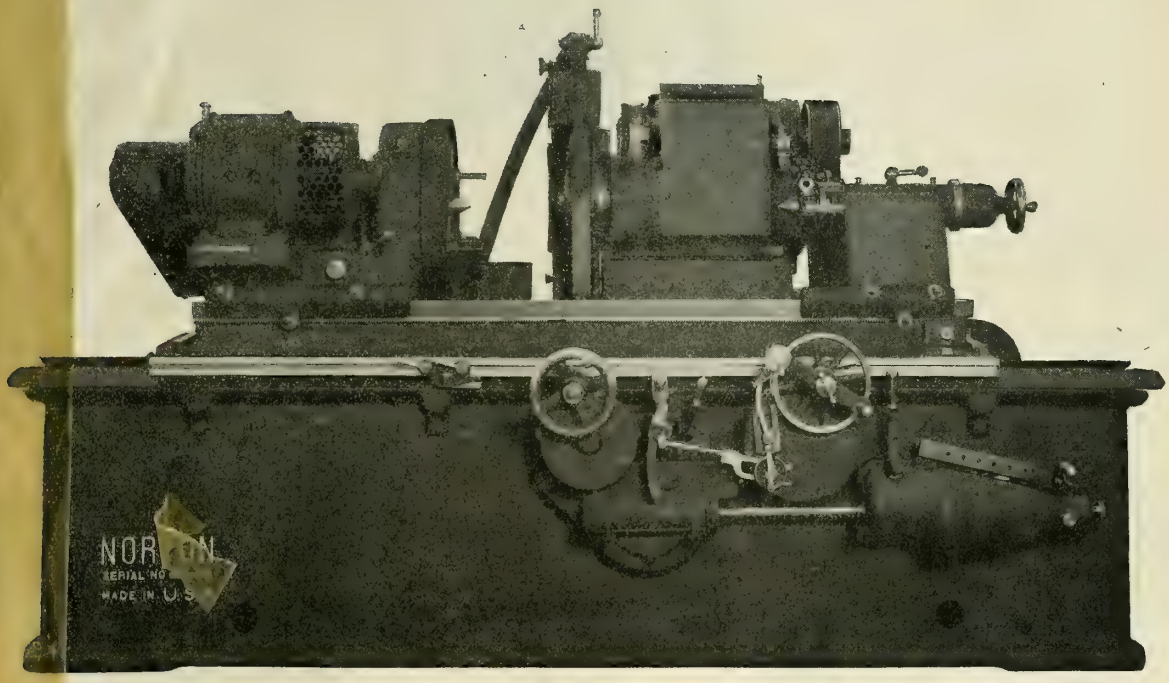
Before proceeding to a description of the physical properties of Hyb-lum, special stress should be laid on the fact that such properties of aluminum and its high-strength alloys vary directly with the amount of hardrolling or cold-working the metal receives in the processes of fabrication. In addition to strain hardening or cold-working, the higher strength forms require heat-treatment and aging. Hyb-lum does not differ in this respect.

The elongation of a given alloy varies inversely with the amount of cold-working performed upon it and, therefore, generally speaking, with its tensile strength. An exception to this statement exists in those in-

(*Continued on next page*)

THE NORTON HI-SWING

Crankshaft Grinding Machine



NORTON Grinding Machines have for many years found an important place in the automotive industry because of their ability to produce continuously large volumes of accurate work. The rapid development of aviation has created another great industry whose requirements are similar — high production with extreme accuracy.

The Norton Hi-Swing Crankshaft Grinding Machine here illustrated was developed for the manufacture of crankshafts for the radial type of airplane motor. These crankshafts require a larger swing than can be accommodated in the ordinary crankshaft grinding machine.

It is also found particularly well adapted for grinding crankshafts for small compressors, Diesel engines and other long stroke motors.

NORTON COMPANY, Worcester, Mass.

NORTON

Grinding Wheels
Grinding Machines

Refractories-Floor
and Stair Tiles

THE GERMAN DIRIGIBLE, L.Z.12;

By Dr. Carl Hanns Pollogg

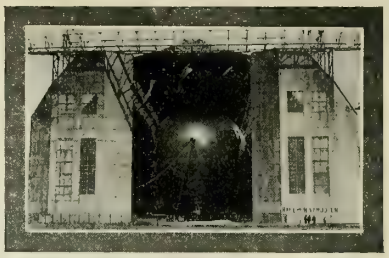
Photographs copyrighted by Luftschiffbau Zeppelin"

AS the type number implies, this ship is the 127th Zeppelin dirigible built. The ship proper has been completed and has been christened "Graf Zeppelin" in honor of the late Count Zeppelin, his daughter performing the christening ceremony. Test flights have been retarded by the necessity of manufacturing a sufficient quantity of the new fuel gas which will be used.

General specifications of the L.Z. 127 are:

Length over all	778 feet
Maximum diameter	100 feet
Maximum height	111 feet
Displacement	3,700,000 cubic feet
Cruising speed	73 miles per hour
Maximum speed	80 miles per hour
Pay load, normal	14.8 tons
Crew, normal	30
Passenger capacity	20
Power plant (5 Maybach V.L.2 engines, of 530 h.p. each)	2,650 h.p.
Range at 62 to 68 miles per hour	6,200 miles

The L.Z. 127 is the largest Zeppelin ship ever built. Generally speaking, its construction is of the same type as other successful



The L.Z. 127 in its hangar in Germany

Zeppelin airships, especially the "Los Angeles" (former L.Z. 126). The form of the hull is streamlined. Stiff-jointed transverse girder frames, each of them representing a regular polygon of 28 angles, compose the skeleton. Between any two of them there are two non-jointed frames, and the distance between the single principal frames is approximately 50 feet. The interior of the hull is divided by them into 17 compartments for ballonets. The main building material is a special alloy which is even lighter and stronger than duralumin. A main gangway leads along the keel frame; smaller gangways connect with the engine cars. A second gangway is provided a little below the main longitudinal axis of the hull; it is rigidly connected with the joints of the principal girder frames and permits an easy access to the ballonets. The hull is covered with a light but specially strong cotton fabric.

A short distance behind the nose of the ship is the main car, which contains the navigation rooms and the passenger accommodations. The steering wheels are mounted in the foremost cabin, whose large windows furnish an unobstructed view to all sides as well as downwards. Here also is a switchboard serving the ballonets and the water ballast tanks. An electric telegraph system is provided to the engine cars. The next cabin is the chart room. It is followed, on the port side, by the wireless cabin. The middle and aft part of this car is occupied by the passengers' accommodations, whi consist of a roomy hall, 16½ feet by 16 feet, which will serve also as a dining roo ten cabins of two berths each, and an ele tric kitchen. The crew's cabins as well compartments for spare parts, food store freight, mail, and baggage are contained the keel frame.

There are five engine cars, two pairs ami ship and a single one farther astern. The are connected to the hull of the ship b means of struts and wire ropes. Each c them carries one 530 h.p. Maybach V.L engine with reversing gear. They are s such a distance from the body of the sh as to be in an undisturbed airflow, and speci care has been taken that no car is in th slipstream of the airscrew of another. Th empennage, of cross-like construction, is s the stern, fins, rudders and elevators.

The most important innovation in th "Graf Zeppelin" is the fuel. Gasoline as fue brings about several disadvantages, of whic the most serious is the reduction of th

(*Continued on next page*)



A passenger cabin in the L.Z. 127



Electric kitchen on board the L.Z. 127



The navigation room of the "Graf Zeppelin" L.Z. 127

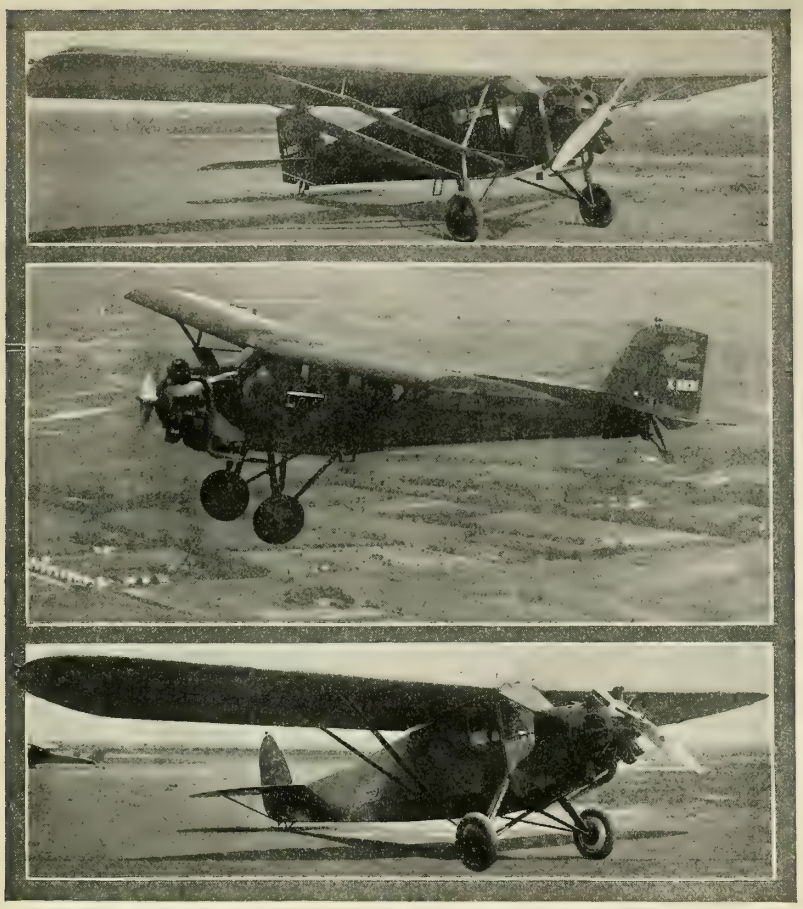


The luxurious hall and dining room on the L.Z. 127

Five Years Ahead!
The first announcement of the new
KEYSTONE "PATRICIAN"
will be made during the Los Angeles Show

KEYSTONE

KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA



Curtiss Robin and Fairchild planes powered with the Curtiss "Challenger" engine.

(*Continued from preceding page*)

ing it. This design provides a rigid cap with excellent support for the babbitt-lined steel-backed bearings. The bearings for the short rods are of bronze. All rods are heat treated steel of "H" section.

The pistons are of cast aluminum alloy, of the regular Curtiss ribbed type with domed heads. There is ample oil collection space within the piston to insure against oil running into the combustion chamber, after the engine is stopped. Each piston is provided with five rings, two compression rings and two oil control rings being located above the piston pin, and a third oil control ring below it. Piston pins are full-floating, of case hardened alloy steel, and fitted with aluminum caps to protect cylinder walls from scoring.

The valve mechanism is actuated by a double cam, driven through a train of four spur gears, eliminating the internal gears usually employed. Heavy duralumin push rods, with hardened steel ball ends, actuate the rocker arms, which are mounted in shielded ball bearings, and equipped with adjusting screws for valve tappet adjustment. These screws are carefully designed to reduce side thrust on the valve stems, and thus increase the life of the wearing parts.

The valves are of special silchrome steel, seating on bronze inserts in the cylinder heads. The excellence of the valve design is attested by the fact that after more than 200 hours of running in the first Challenger engine, the valves, without being ground, were found still to hold gasoline when tested.

All accessories are located on the rear of the crankcase, where they are protected from rain and dirt. The regular equipment includes two high-tension Scintilla magnetos, and pressure and scavenging oil pumps. Provision is made for standard types of starter, generator, and plunger type gun control for military planes. All accessories are driven through spur gears, which require no adjustment.

The lubrication system is the "pressure and scavenging" type. A pressure pump feeds the oil tank through a fine screen in a small pressure chamber, to the rear main bearing, which is used as an oil seal. The screen is designed as a valve so that during cold weather if the oil is too thick to flow through the screen, it will lift from its seat and permit the oil to flow around it. The oil feeds into the crankshaft and the pressure is controlled at the propeller end by a by-pass valve accessibly located in the nose casting. This method of control insures positive pressure to every point in the crankshaft, from which oil is distributed to all parts of the engine. The return oil collects in a sump at the bottom of the crankcase, so located that oil will drain into it at gliding altitudes. The pressure and scavenging screens, oil drain plug, and oil thermometer well, are in this sump. A single scavenging pump removes oil from the sump and returns it to the oil tank. The rocker arm bearings and ball ends are lubricated from Alemite connections on the rocker boxes.

The carburetor is a Stromberg NA-U4J double barrel type, specially developed for use with the Challenger engine. Extensive flight tests have demonstrated that the excellence of carburetor and induction system design provides the Challenger with remarkable acceleration from idling to full throttle speed, and smooth operation throughout the entire range. The carburetor is attached to the lower rear end of the crankcase for use with a gravity gasoline system. Provision is made on the engine for installation of an Army type O-5 fuel pump if it is desired to use a pressure fuel system.

To insure perfect carburetion in cold weather the carburetor is exhaust jacketed around the barrels, using a hot-spot elbow taking exhaust heat from the lower left cylinder. The hot-spot elbow is fitted with a valve to control the amount of exhaust heat admitted to the carburetor. This arrangement prevents the formation of ice in the carburetor and insures proper carburetion in any weather, without the loss of power caused by the usual type of auxiliary heater, which heats the air going to the carburetor.

Ignition is provided by two six-cylinder high tension Scintilla magnetos located on the rear of the crankcase. There are two spark plugs per cylinder, thus affording a reliable dual system of ignition. The magnetos are easily removed for overhaul.

Specifications Curtiss Challenger

Model	R-600
H.P. (rated) at 1800 r.p.m.	170
Number of cylinders	six
Bore	5⅛ inches
Stroke	4⅞ inches
Diameter of engine	42⅝ inches
Displacement	603 cubic inches
Fuel consumption (cruising),	.50 pounds per b.h.p. per hour
Oil consumption,	.015 pounds per b.h.p. per hour
Weight	420 pounds

TEST for ALCLAD ALUMINUM ALLOY

THE Aluminum Co. of America suggests a simple shop test to distinguish between aluminum alloy and "Alclad" alloy. This test consists in making a scratch on the suspected material by using the sharp corner of a piece of aluminum alloy sheet. Aluminum alloy being harder than pure aluminum, the "Alclad" sheet will show a deeper scratch for the same effort. The difference of the "feel" and in the depth of the scratch which is produced on a flat surface of aluminum alloy and on a flat surface of "Alclad" alloy is so pronounced as to leave no question as to which of the materials is "Alclad."



NEARER

This great new-day monoplane approaches.

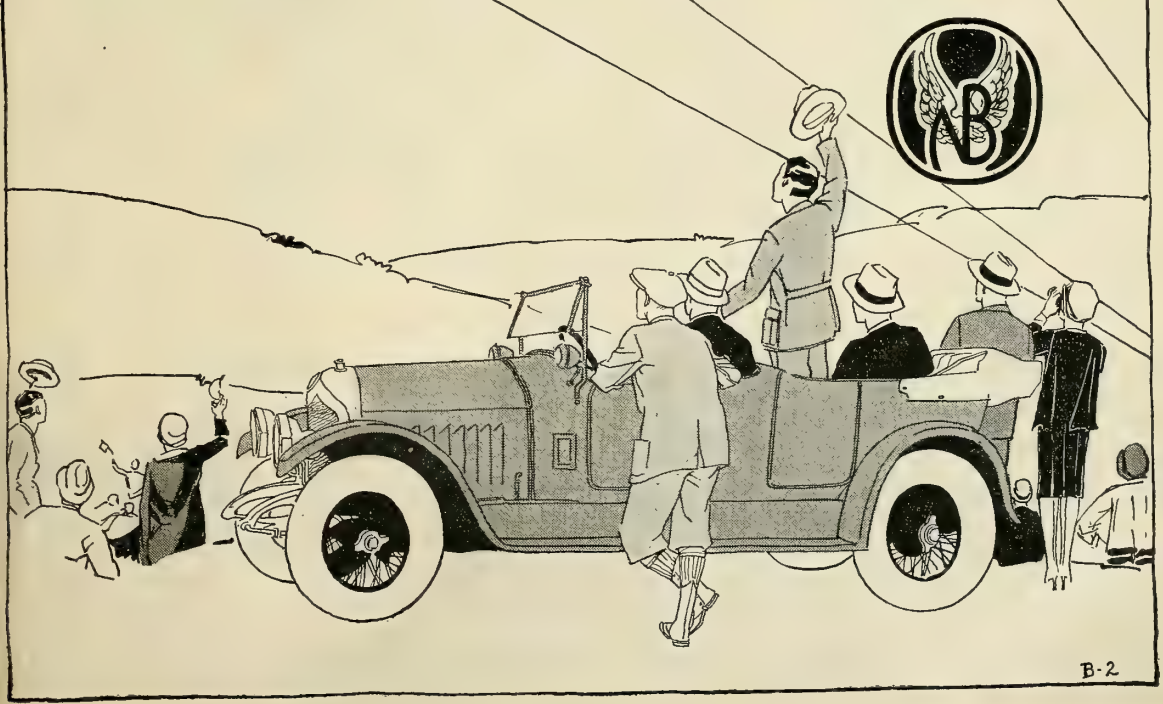
With it comes new principles .... new ideas of performance .... of safety .... newer, higher standards in aircraft.

Walter H. Barling, internationally known aeronautical engineer, has a design better than the dictates of your greatest hopes.

It is a monoplane for everyone—a great advance over anything now on the market.

Wait and see the Barling NB-3!

NICHOLAS-BEAZLEY AIRPLANE COMPANY, INC.
MARSHALL, MISSOURI



B-2

Say you saw it in AERO DIGEST

THE BUHL SPECIAL AIRSEDAN

By LOUIS G. MEISTER

THE Buhl Special Airsedan was designed to fill the demand for a closed plane with high performance for use in cross-country flying or air mail service where it is essential to maintain a cruising speed of well above 100 miles an hour and to carry fuel for flights of from 600 to 700 miles. For this type of service we believed that it was not necessary to design a plane for large load carrying capacity as it was not required and it is more satisfactory and economical from the operator's standpoint and also the private owner's to obtain the desired high speed performance by producing a plane smaller and lighter than the general run of Whirlwind-equipped planes.

The designer of this plane is Mr. Etienne Dormoy, whose experience in designing planes dates back to the original Deperdussin, Spad and Le Pere. He was also Assistant to the Chief Engineer at McCook Field for five years, which time was devoted entirely to the design of military planes.

We make this design a sesquiplane as we believe this type to be the most efficient type of design for a strength-weight ratio. The general all round performance of this plane has more than fulfilled our fondest expectations.

The general lines of this plane follow those of our other models and have retained the pointed front and smaller lower wing panel, which are characteristic of all Buhl planes. The shape of the wing of this particular model is almost triangular in form mainly for structural reasons. The wing shape permits of a very wide spar spacing at the fuselage, which is highly desirable so that the fuselage main bays may be kept the same length at the lower wing attachment points as at the upper. The spars being carried to a point at the wing "V" strut also eliminates any drag bracing in the lower panel since the spars and inter compression ribs completely triangulate this panel.

The visibility of the pilot is exceptionally good due to the pointed windshield and the large side windows, all of which may be opened for ventilation.

There is also a heater for winter flying and the cabin can be heated.

Normal arrangements are for a pilot and two passengers, the pilot sitting forward and the passengers occupying a large seat at the rear of the cabin. The cabin is exceptionally large being completely upholstered after the style of the best motor car practice and presents a pleasing and comfortable appearance. Back of the rear seat is a compartment for the storage of a large amount of baggage, which is desirable in a fast cross-country plane. The plane has good take-off and climb performance and with the propeller set for maximum high speed it has shown a speed of 140 miles per hour in four runs over a two-mile speed course.

The spar construction is of the box spar type using spruce for the top and bottom members and mahogany veneer at the sides. Spruce blocks are placed at all wire pulls, compression members, and fitting locations. Ribs are built up of spruce, Warren truss type with veneer gussets running full length and both sides of the top and bottom, the strip thereby forming a channel section.

There are three bays in each wing, double drag wires of square swaged wires being used. Compression members are steel tubes. The leading edge is covered with sheet aluminum and the trailing edge is a steel tube. Wings are covered with Grade "A" fabric and tape, and cap strips are sewed over each rib the same as the standard Army practice. All wood and metal parts of the wings are covered with one coat of Lionoil and two coats of spar varnish. The wings are wired for navigation lights and the navigation lights are built into a box on each wing tip. These are very visible from all angles and show considerably more light than the standard type navigation lights. The wing tip is of aluminum tubing which runs completely around the tip and is fastened at the leading edge and both spars.

Ailerons are novel and interesting, having a small part toward the end with a Friese balance. This gives an area which is rigid and by not having the balance protrude over the outer edge of the wing, it eliminates wing flutter. The external strut is of seamless steel, streamline shape, with an adjustment end to facilitate rigging.

The fuselage is rectangular in shape, made up of seamless steel tubing diagonally braced between all bays and slightly faired at the top and bottom. The covering is applied on the fuselage and sewed to wood batten strips. It is finished in four coats of clear nitrate dope and three coats of lacquer.

The control surfaces are welded seamless steel tubing. Hinges are made of bronze with steel pins. These give a well wearing and smooth type of bearing.

The make of brakes and wheels is optional. The tire size is 30 by 5. Fittings on the fuselage can be used for attaching floats. The tail skid is of seamless chrome molybdenum heat treated seamless steel tubing and is steerable. Shock absorber cord is used on the top and a manganese steel casting used as a tail skid shoe.

The engine mount is not detachable but is carried on through from the longerons and braced from the forward bulkhead which also supports the fire wall. The cowling is easily detachable and is ventilated at the rear of the engine. The cowling between the cylinders is held to two rings which are placed both front and back of the engine. No spinner is used on the propeller but a spun nose-piece is fastened to the front of the engine on the front cowling ring rigidly supported to the engine.

The exhaust system which includes a manifold carburetor heater and muffler is proving very satisfactory under all service conditions on the standard Airsedans.

The cabin is readily accessible through two doors, locks being fitted into the handles so that clothing, baggage, etc., can be left in the plane the same as the owner can lock up his automobile. The windows are all of Indestructo glass and can be slipped open so as to give the desired amount of ventilation.

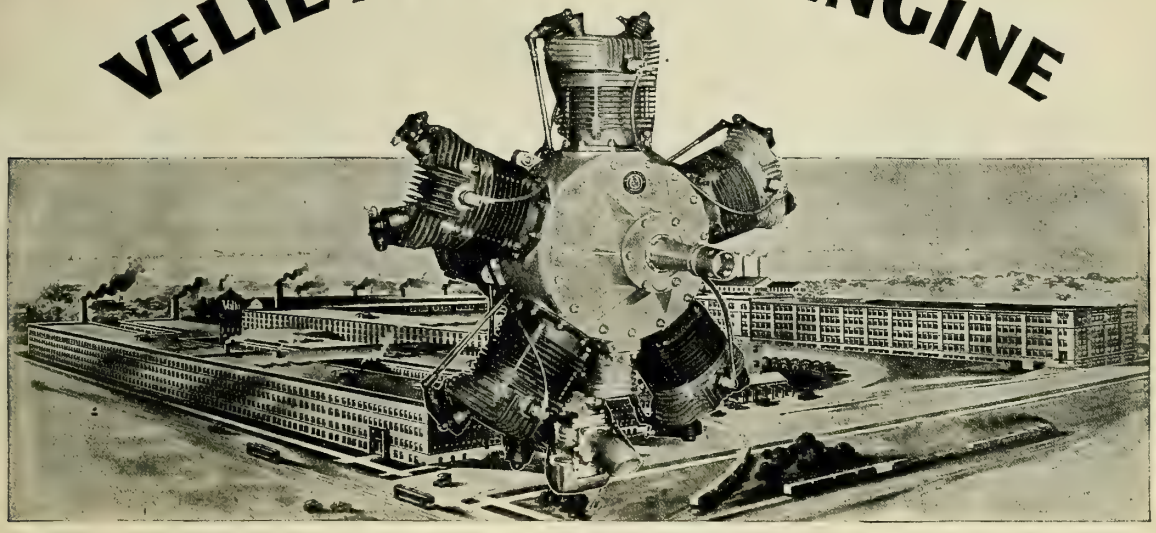
The instrument board is straight across the cockpit in front of the pilot and a small triangular board above it fitting in the pointed "V" of the windows makes a convenient place for the pilot to lay his maps while flying, being directly in front of him at all times.

Throughout the entire design, the requirements of the Department of Commerce have been complied with and the plane is licensed to carry a useful load of 1420 pounds. This plane is licensed under Approved Type Certificate No. 46.



The sesquiwing Buhl Special Airsedan powered with the Wright Whirlwind engine.

VELIE AIRCRAFT ENGINE



Government Approved Type Certificate No. 4

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"Ask the Pilot"

VELIE MOTORS CORPORATION, *Moline, Illinois*

Long Life **VELIE** *OWNED AND OPERATED BY ITS FOUNDER....1908-1928*

(*Continued from preceding page*)

and lands at 20 miles. In a stall it has no tendency to spin; this feature, with the slow landing speed, makes the plane especially suitable for beginners in solo flying. In the air the engine uses but two gallons of gasoline per hour.

The Whizbang is finished in blue and silver colors. The wings and fuselage are of spruce; the landing gear and wing struts are of steel tubing. The landing wheels are 38 inches by 3 inches. General specifications of the Whizbang are: span 31 feet; chord 6 feet; length 20 feet; height 8 feet; weight empty 500 pounds.

BACH SUPER TRANSPORT

SOME very novel engineering features have been developed and incorporated in the design of the 4-motor 25-passenger Bach Super Transport, of which advance information is presented here for the first time. The Bach Company will be in its new factory about October 1st and construction will start on the Super Transport shortly after.

This ship will be of sesquiplane type, using four engines, of 410 h.p. each—two of which are located on the bow, one above the other, and one mounted on each side between the wings, with propellers in line with baggage compartment. This engine arrangement permits the use of extra long two-bladed propellers without overlapping of their disc areas.

The fuselage is to be a truss type steel tubing structure, aluminum, plywood and fabric covered, and will have two main cabins,—one above the other, with a stairway connecting upper and lower floors. A lounge room and lavatory are to be located at the rear of the lower main cabin. A large mail and express compartment will be located under the stairway. In front of main cabins, running from top to bottom, is located the main baggage room, accessible from both main cabins and from without. At the rear of the upper cabin a comfortable smoker and buffet are arranged. The passengers will be free to move about as the cabins, stairs and passageways are quite roomy and have a minimum ceiling height of six feet three inches.

The pilot's cockpit is located in front of the baggage compartment, between the upper and lower engines which have a ten foot hub center clearance. Entrance to the cockpit can be made either from the outside or from upper or lower main cabin.

The landing gear will have an exceptionally large tread—20 feet 6 inches—using twin self-energizing brake-equipped wheels, mounted on a full floating equalizing axle which permits full ground contact on all four wheels on rough ground at all times. The tail wheel is steerable and the streamline around the wheel becomes part of the rudder in flight. All shock absorbers are hydraulic with rubber cords for taxiing.

The gross loaded weight of the completed ship will be 16,000 pounds. It is calculated to have a top speed of 152 m.p.h. and cruising radius of 800 miles at 120 m.p.h. The ship is designed to cruise on any three engines and maintain level flights at 92 m.p.h. on two engines.

Additional specifications are as follows:

Bach Super Transport

Gross weight	16,000 pounds
Span, upper wing	85 feet
Span, lower wing	65 feet
Chord, upper	12 feet
Chord, lower	8 feet
Wing loading	1.15 lbs. per square foot
Power (4 Pratt & Whitney Wasps)	1,620 h.p.
Power loading:	
2 engines	19.5 lbs. per h.p.
3 engines	13.0 lbs. per h.p.
4 engines	9.8 lbs. per h.p.

PARR AERO-SHIP CHUTE

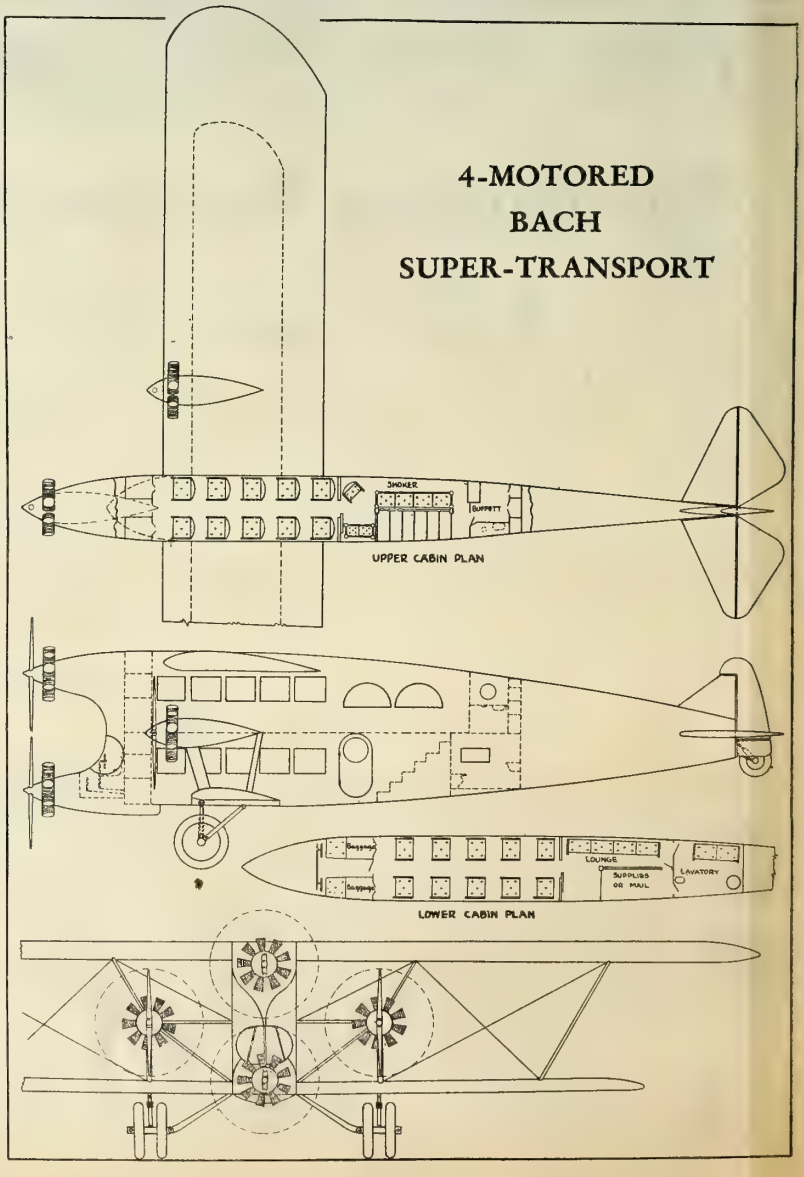
THE Parr Aero-Ship Chute is now being manufactured under the Parr patents in Los Angeles by the Safety Aero Appliance Corporation.

The Parr Aero-Ship Chute, in the case of the biplane or the high-wing type monoplane, is built flush into the wing surface. The device can be applied to any standard type of airplane.

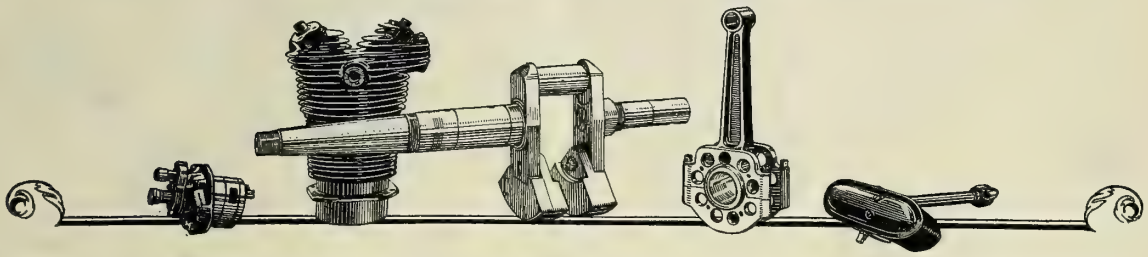
It requires 2½ cubic feet of space and weighs 125 pounds. Through a simple device in the cockpit the pilot effects a release under 2,000 pounds pressure, throwing the chute vertically and giving 1,600 square feet of effective area, unfolded. The entire mechanism is designed to absorb a strain of 27,000 pounds.

Recent experimental and development tests made under army and navy observation proved an opening time of 4¼ seconds from a 1,000-foot altitude with a 400-pound load, and approximately 2 seconds required for opening with a load of 2,500 pounds.

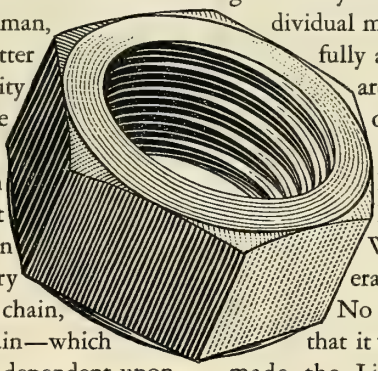
It is claimed that the device permits of a three-point landing under 20 miles per hour.



There is *NO* Most important part of a WRIGHT ENGINE

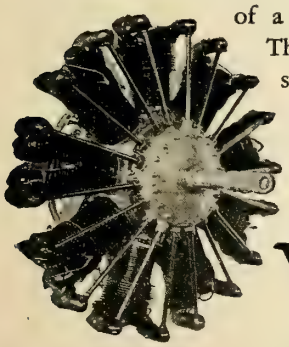


"THIS little rocker arm", said a Wright workman, "could cause as big a 'bust' as a broken master rod". The attitude of this man, his realization that his job, no matter how small, involves a responsibility as important as that for the entire engine, is typically Wright. That is what is meant by the expression "Wright engines have no most important part". Every workman throughout the Wright factory knows he is forging one link in a chain, and that the strength of that chain—which perhaps must span an ocean—is dependent upon the link he makes.



Every part—however small—is made with the same care as every other part. The steel for a tiny nut or bolt is heat-treated, machined, inspected, tested and retested with the same scrutiny, the same vigilant alertness, the same refusal to pass anything but perfection, as characterizes the making of a master connecting rod. This knowledge of responsibility, permeating every individual workman in the Wright factory, is what makes Wright engines good. They are designed right, made by special individual method in every tiny part; built carefully and slowly by men who know they are making an unusual product...one on whose performance the eyes of the world may rest at any moment. Never has this spirit faded. The day Lindbergh landed in Paris behind his Whirlwind Engine, the Wright operating force paraded through town. No man was their leader: each man felt that it was the perfection of his work that made the Lindbergh achievement possible. Lindbergh's engine was *their* engine.

There is "no most important part" in a Wright engine. Each part carries the full responsibility of performance, because failure in any part is failure in the whole...For more than a decade Wright has been building engines with just such care as this...to produce aircraft power plants that measure up to the highest standard of excellence ...an unchanging policy which explains Wright engine performance.



Wright "Cyclone" Aeronautical Engine

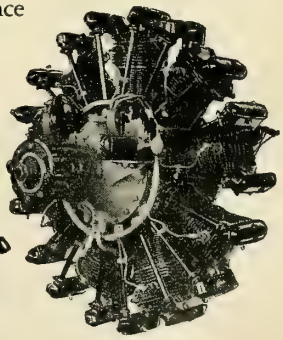
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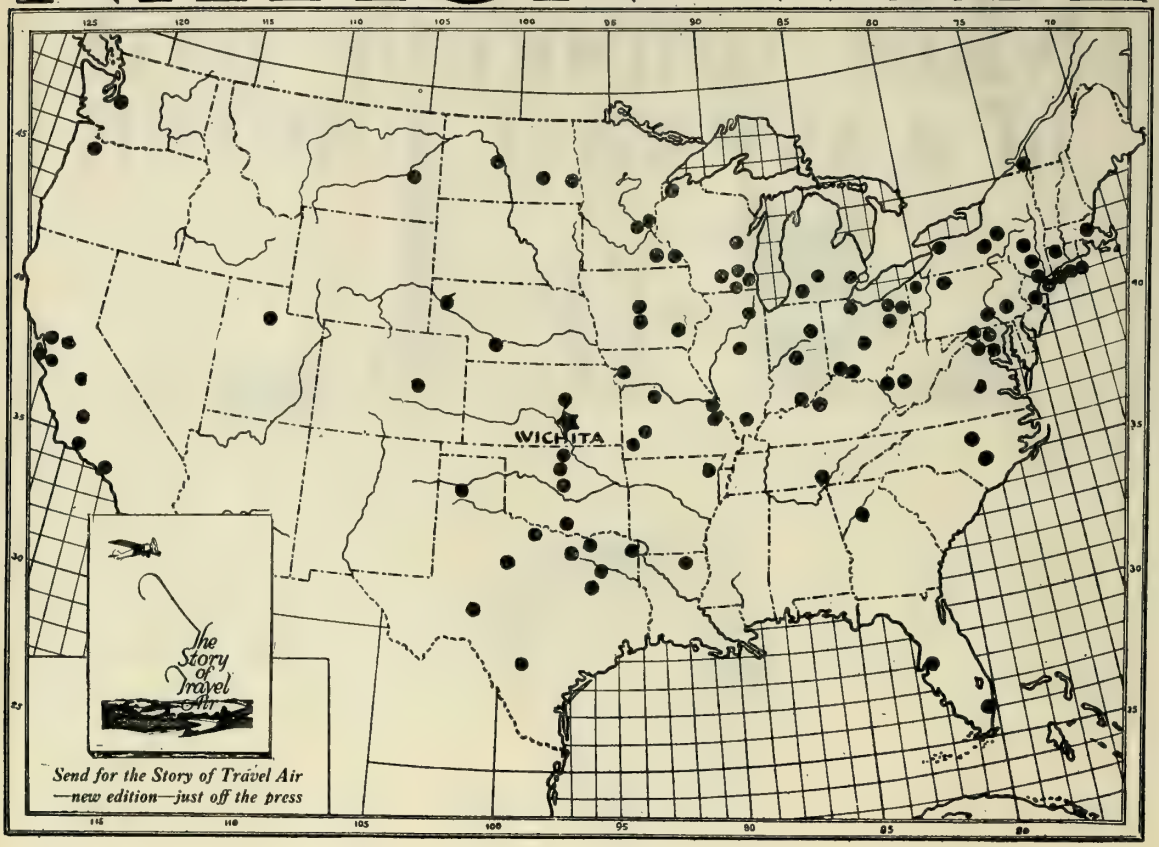


Wright "Whirlwind" Aeronautical Engine

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NATION WIDE



THE Honor Roll of Travel Air distributors and dealers now numbers 106. Their names and addresses are on the opposite page. These are the men who have made aviation history. These are the men who are the pioneers in the new and fastest growing business in the world. These men realize the "Air Age" is here—that æronautics is no longer a game but an industry, the sales possibilities of which have not been scratched —that the greatest development in aviation is just ahead.

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Say you saw it in AERO DIGEST

CALIFORNIA SETS A PACE in the AIR

By Hi Sibley.

THROUGHOUT the world some new record is being made for distance, endurance, altitude or speed almost weekly, but it is doubtful whether any of these achievements surpass the thrills afforded by that pioneer meet held at Dominguez Field, Los Angeles, eighteen years ago, and which was ambitiously styled by the promoters, "First in America Aviation Meet".

At that period the air was really an unchartered sea and the pilots who had the courage to go aloft in those flimsy ships of bamboo and fabric were real adventurers. True, they seldom got out of sight of the grandstand, but that made it all the more exciting. Spectators little realized how close they were to destruction when some daredevil skimmed down to within sixty feet of their heads—as frequently happened.

Men prominent then, and some of them important figures today in the world of aviation and aeronautics, were entered in that first meet: Glenn Curtiss, Louis Paulhan, C. K. Hamilton and others. Arch Hoxsey, a Pasadena boy of great promise, was killed in the second annual meet, and Lincoln Beachey, pilot of both dirigible and airplane, subsequently crashed at the San Francisco Fair.



Arch Hoxsey and Orville Wright—1909

In 1910 no one knew which type of craft was destined to dominate the air, but there were many confident predictions by adherents of the airplane and of the lighter-than-air ships. At this early day even the automobile was still a luxury of the well-to-do, and as many carriages were parked on the field as automobiles.

Standardization of design was far in the future. The airplanes exhibited were as different from each other as were automobiles of ten years before.

Bleriot's trim little monoplane, the same model as first to cross the English channel shortly before, more closely approached present day design than other types present. It was a tractor, i. e., the propeller was in front and was powered by an air-cooled motor. Bicycle - wheel landing gear and a tail skid gave it the appearance of modern monoplanes, except that from the cockpit to the tail the fuselage was uncovered, giving the impression of being dangerously frail.

The biplanes, Wright as well as Curtiss, had their elevators located far out in front of the pilot, who sat on a tiny seat on the spidery framework forward of the lower wing, completely exposed to the elements but enjoying an unobstructed view on all sides—including the ground far below. These two models were of the pusher type, the Wright having two propellers in back driven from the engine through bicycle chains. The propellers revolved so slowly—or comparatively so—that one could see the blades. They turned in opposite directions, one of the chains being crossed and guided through tubes to achieve the reverse direction.

Every maneuver was observed with the keenest interest, and occasionally the fliers treated the spectators to stunts not on the program. Once Louis Paulhan, intrepid Frenchman, made a forced landing about a mile from the grandstand at the second meet. Mechanics hurried over on foot and soon had his Farman biplane in order again, but, instead of allowing them to walk back to the base, Paulhan insisted they climb aboard, which they did, and he soared back to the grandstand close to the ground with four men clinging to struts and wings.

During this same meet Arch Hoxsey came to his tragic death in a crash soon after he had established an altitude record of 11,474 feet over Mt. Wilson. Hoxsey was a popular idol, and a banquet had been prepared at the Hotel Maryland, Pasadena, in his honor the day he was killed. The entire community went into mourning over the loss of this young hero. He had distinguished himself in St. Louis a year before by being the first to give Theodore Roosevelt an airplane ride.

Trials were made for slow flights around the pylons marking the triangular course, the ability to remain in the air at a moderate speed being considered a great safety factor in those days. In fact, some of the planes were able to land at from 20 to 30 miles an hour. The modest power of these early models did not permit spectacular climbing; it is surprising that some of them could climb at all. In the 1910 event, C. K. Hamilton won the climbing record at the rate of about 30 feet per minute! His time was 12 minutes 33-3/5 seconds, for 364.5 feet.

Two small dirigibles of about 5,500 cubic feet capacity were entered, piloted by Roy Knabenshue

(*Cont. on p.* 614)



Composite view of the aircraft at the 1910 Los Angeles meet at Dominguez Field

The

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of America

invites your participation

in the

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to be held in the

Chicago Coliseum

December 1st to 9th, 1928

This Exposition

is to precede the

International Conference on Civil Aeronautics

which has been approved by

PRESIDENT COOLIDGE

to be held in Washington, D. C.

December 12th, 13th, and 14th, 1928

Say you saw it in AERO DIGEST

OUR FIRST AIR MEET—1910

THE midwinter international aero meet which was held in Los Angeles January 10th to 20th, 1910, was the first meet of its kind in America. From a financial and sporting standpoint the event was a great success. On some days the attendance reached as high as 40,000 to 50,000 persons, and on no day did the attendance fall as low as 20,000. The track was located on a field near Dominguez Junction. It was 1.61 miles in circumference and somewhat elliptical in shape. The grandstand was situated on one side of the ellipse, facing a broad valley toward the city of Los Angeles. This grandstand had a seating capacity of 20,000 persons. Here, on historic ground, world's records were broken, and cross-country flights were undertaken that demonstrated beyond the question of a doubt the practicability of the aeroplane.

The daily program of the meet, written by Prof. H. La V. Twining of the Aero Club of California appeared in *Aeronautics Magazine* for March 1910; it is republished here because of its interesting historical significance particularly at this time.

* * *

1st Day, January 10

The meet opened with a decided French accent, inasmuch as Paulhan, in his old Farman, was the only aviator to make a complete circuit of the course (1 61-100 miles) during the day.

Glenn Curtiss started events by making a qualifying flight on a brand new machine. Chas. F. Willard, with the Curtiss machine of the Aeronautic Society, in a pretty flight, made the fastest time of the day, doing a mile in 1.23.

Paulhan's appearance was made in his usual spectacular manner. He sneaked out of his tent and without the formality of bundling up before the grand stand, he sailed away up the back stretch, around the turn, and bore down upon the crowd in full career.

Curtiss again got off the ground for 1.125 mile in his 8-cylinder Rheims winner, going this distance in 1 min. 51 sec. Although he did some nice cautious flying, he lacked the brilliant daring of the Frenchman, who made three flights of 10¾, 4½ and 8¾ miles, the last at an elevation of 400 ft.

C. K. Hamilton in his Curtiss made a flight of 1¼ miles in poor time.

To the presence of Cortlandt Field Bishop, president of the Aero Club of America, is due some well advised and necessary changes in the prize list.

Knabenshue and Beachy brought out their dirigibles. The former had a brush with Paulhan in which the Frenchman easily passed him, going two feet to his one.

BALLOONS

All ascents were made from Huntington Park, near Los Angeles.

The lack of interest in ballooning was disappointing, but was not to be expected, considering the distance to the grounds and the superior attraction of the aeroplanes. Clifford B. Harman's beautiful Baldwin silk balloon "New York," 80,000 ft., made a short ascent with Geo. B. Harrison, aide, and four passengers to Colegrove, distance 12 miles.

Frank J. Kanne in the "Peoria," 40.000 cu. ft., followed, with J. C. Mars, aide, to Colegrove, distance 12 miles.

2nd Day, January 11

The day opened with a gusty 20-mile wind which deterred all but Paulhan from venturing forth. He made three flights of 8¾ miles, 5 and 2½ miles, and although later Curtiss broke two world's records, the smiling Frenchman by his splendid work was the redeeming feature of a poor afternoon's program.

CURTISS MAKES WORLD RECORDS

In the contest for rising in the shortest distance, Curtiss easily broke the old world's record by getting away in 98 ft. The best Paulhan could do was 191 ft.

In the contest for the quickest time in rising from the start of the motor, Curtiss made a new record of 6 2-5 sec. from the first explosion of the engine. Paulhan's time in a Farman was 12 2-5 sec., and in Bleriot 35 sec. Starting from line after engine was warmed up, Curtiss got off in 5 3-5 sec.

Willard made a beautiful descent in a trial for landing on a 20 ft. square, giving him 100 points.

Miscarol brought out one of the two cross-channel type Bleriots, but only succeeded in breaking a wheel after making ¾ of a mile in poor time.

Paulhan took the other Bleriot and managed to cover 2 miles in 5 min. 6 sec. Altogether the Bleriots have made a miserable showing thus far. Though beautiful pieces of workmanship, they were almost unmanageable owing to the disuse of the warping device (Wright suit) and the inexperience of the aviators with this machine, though Paulhan's showing in the strong wind was very creditable. Excepting Paulhan, the widely advertised Frenchmen seemed to be only mechanicians.

Hamilton, turning too low in a short flight, struck the ground and damaged his front control.

Prof. J. S. Zerbe's heavy multiplane proved too slow and heavy to get off the ground.

Edgar S. Smith, tuning up the motor on his Langley type machine, was struck on the head by the propeller and knocked unconscious.

55-MILE SPEED WITH PASSENGER

Curtiss was the first to take up a passenger, carrying Jerome S. Fanciulli for a flight of a mile, his Aerometer registering the high speed of 55 miles per hour. On a second trip he carried C. B. Harmon. The passenger seat is placed on the left side of the aviator, and while off center it appeared to make no difference in control. Paulhan made one passenger flight.

BALLOONS

F. J. Kanne, M. L. McKeever and another, in the "Peoria," to Florence, distance 10 miles.

3rd Day, January 12

The events are so arranged that there will be no fixed program for each day, but every day the aviators may try for any one of the prizes if they are ready with their machines and the weather is good.

PAULHAN MAKES NEW HEIGHT RECORD

Paulhan was again the star, breaking all records for height. The figures of the engineering squad were 4,165 ft., while the aneroid on the machine read 4,600 ft. Paulhan was 43 min. 16 1-5 sec. in reaching this altitude, and but 7 min. 30 sec. in descending. This record was made with a new type Farman just assembled. The total duration of the flight was 50 min. 46 1-5 sec.

Curtiss, with Harmon's machine, made a record for the course of 2 min. 13 3-5 sec., only to break it with Willard's "Golden Flyer," which made it in 2 min. 12 2-5 sec. The best lap by Paulhan was 2 min. 25 3-5 sec. His 5-lap trial for the course was 12 min. 23 1-5 sec., unofficial by reason of the fact that judges had not been posted at the "pylons" to see that there was no cutting of corners.

Hamilton, after considerable engine trouble, got away, and after a circuit of the course took a short cross-country trip over the dirigible tents. Clifford B. Harmon got off the ground for about 100 ft. in a maiden flight on his Curtiss, of which he took delivery at Los Angeles.

The day was a tiresome repetition of the preceding one with the exception of Paulhan's high flight and a short passenger flight of the Frenchman.

BALLOONS

C. B. Harmon, Geo. B. Harrison, aide, and five other passengers in the "New York," landed (after being towed) in the center of the aviation field. Distance 6 miles.

C. F. Willard, Geo. Duessler, and four others, in the new "Dick Ferris," 80,000 ft., landed at Santa Monica. Distance 18 miles.

J. C. Mars and two passengers, in the "Peoria," to near Palma, distance 10 miles.

4th Day, January 13

In the 10-lap speed contest Curtiss beat Paulhan by only 5 sec. in the distance of 16.11 miles. Curtiss's time was 24 min. 54 2-5 sec.; Paulhan's was 24 min. 59 2-5 sec.

Willard took the honors for leaving the ground and stopping the machine in a 20 ft. square, showing fine control over his Curtiss.

PAULHAN CARRIES TWO OTHERS

Paulhan again saved the day from being dull, his spectacular passenger flights taking the crowd's fancy. He carried up eight passengers in two hours, in one flight carrying two besides himself.

The remarkable effect of an aeroplane getting in the wake of another was well shown today. Paulhan cut in ahead of Curtiss during the latter's 10-lap trial, and Curtiss's machine was seen to drop like a stone in the downwardly moving air of Paulhan's wake.

BALLOONS

J. C. Mars, K. L. Bernard and three others, in the "Los Angeles," 82,000 cu. ft., to near Burbank. 31 miles.

5th Day, January 14

Paulhan again the whole show, making a 21¼ mile cross country flight over San Pedro harbor and return, and making a one-lap track passenger record of 2 min. 30 sec.

Chas. K. Hamilton made a course record of 3 min. 36 2-5 sec. in a trial for slowest time for one lap. Willard's slowest was 3 min. 11 1-5 sec.

Curtiss lowered his own one-lap track record, doing the lap in 2 min. 12 sec. Paulhan made the lap in 2 min. 21 1-5 sec. Willard made two laps in 3 min. 04 1-5 sec. and 3 min. 01 2-5 sec. respectively in the fast lap contest.

Hamilton in an altitude trial made 364.5 ft., up 12 min. 33 3-5 sec.; Curtiss, 247.6 ft.

Today saw the first official circuit of the course in a Bleriot, Paulhan going the lap in 2 min. 48 sec. It was the only lap made by a monoplane during the meet.

Roy Knabenshue made a dirigible record of 5 min. 10 2-5 sec. for one lap, and in a race with the Beachy airship made it in 6 min. 29 3-5 sec.; Beachy in 7 min. 50 sec.

BALLOONS

Geo. B. Harrison, alone, in the "Los Angeles," qualifying trip for pilot license. Distance, 3 miles.

6th Day, January 15

Weather bad. Raining. Track heavy. Miscarol practising with one of the Bleriots broke one of the wings and severely damaged the chassis.

The only interesting event of the day was the brush between Paulhan and Hamilton during the latter's 10-lap trial in which the Frenchman with his more powerful motor easily passed Hamilton. Hamilton's time for the ten laps was 30 min. 34 3-5 sec.

Curtiss, Hamilton, Willard and Paulhan each made qualifying rounds.

The Knabenshue dirigible manœuvered at a height of 60 ft., dropping bombs in a 20 ft. square—though the lesson to be gained at this low elevation is problematical. He made one lap of the track in 5 min. 33 sec., and Beachy one lap in 5 min. 21 sec.

7th Day, January 16

High wind and rain. Paulhan made several flights, one with two passengers, and also went after the record of Curtiss for short distance in rising, but best he could do was 118.3 ft.

Hamilton tried to beat Curtiss for quick start; his time was 9 1-5 sec.

Hamilton, Curtiss and Willard each made a flight and were deserving of much credit for attempting to fly in the strong wind with their light machines. A feature was Curtiss's terrific speed going with the wind.

The Knabenshue and Beachy airships, after attempting to buck the wind, gave up and went back to their sheds.

BALLOONS

"Peoria," J. C. Mars and two passengers, to Boyle Heights, 9½ miles.

"New York," Geo. B. Harrison and two passengers, to Boyle Heights, distance 8 miles.

"Dick Ferris," Geo. Dressler and four passengers, to Sierra Madre, 13½ miles.

8th Day, January 17

TWO HOUR FLIGHT

But for a leaky gasoline tank, Paulhan might have today made a new American record for endurance. He had covered 75.77 miles in slightly less than two hours when he came down by reason of a leak in his gas tank. Total time in air, 1 hr. 58 min. 32 sec. Hamilton also tried for the endurance record, and had covered 12 laps, 19.45 miles, in 39 min. 00 2-5 sec., when it was seen that an upright on his machine had slipped from its socket and he was flagged.

Curtiss again went after the 10-lap record, cutting more than a minute off his old mark, doing the distance in 23 min. 43 3-5 sec.

(Continued on next page)



Program cover of the first aviation meet in America—Los Angeles, 1910

Courtesy Dr. Ford A. Carpenter.



Executives-

Cover the entire aeronautical industry at the 1928 National Air Races and Aeronautical Exposition

The entire aeronautical industry will be on dress parade at the 1928 National Air Races and Aeronautical Exposition. New planes, new motors and new accessories never before exhibited will be on display. The old line planes will be there with their latest improvements. This is your opportunity to cover the entire industry—to see what others are doing—in nine days. In months of traveling you could never cover the field more completely.

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California Air Race Association
Cliff Henderson, *Managing Director*
Ambassador Hotel Los Angeles

(First Air Meet continued)

Hillery Beachy made several short jumps in the Gill-Dosh machine, but lacked skill in raising from the ground.

Masson, one of the foreigners, tried out a Farman, and with a little more practice should be able to cover the course.

Paulhan, for the first time, tried his hand on an American machine (Willard's Curtiss), but did not succeed in making more than jumps.

BALLOONS

J. C. Mars, in the "Dick Ferris," with three passengers, to Moneta Ave., three miles.

9th Day, January 18

HOUR FLIGHT CROSS-COUNTRY

Paulhan's magnificent 45¼ mile cross-country flight to Santa Anita race track and return was naturally the greatest event of the week, arousing enthusiasm admixed with awe that eclipsed that on the day of his high flight. It was wonderful to see him gradually growing smaller and finally disappear against the white of snow on the background of mountains. His return was equally awesome from the time he was a tiny dot, high in the air above the mountains, till the moment of his landing. It was the supreme happening of the meet. Elapsed time, 1 hr. 2 min. 42 4-5 sec.—within 17 1-5 sec. of the Cody record. Distance each way, 22½ miles. Greatest height 600 meters, or 1,988.8 ft. Engine behaved well. Paulhan viewed the country as he flew, using field glasses.

Short flights by the other aviators completed the day.

Trials for rising in short distance: Curtiss, 148 ft. 9 in., 114 ft. 6 in.; Hamilton, 154 ft. 9 in.

BALLOONS

J. C. Mars and two passengers in the "Peoria" to Boyle Heights, 6 miles.

Geo. B. Harrison and C. F. Willard, in the "New York," to Aviation Field, 9 miles.

10th Day, January 19

* Paulhan broke the world's record cross-country passenger flight today, taking Mme. Paulhan a distance of 21¼ miles for the round trip. Elapsed time, 33 min. 45 2-5 sec., leaving Aviation Field and circling over Redondo and Hermosa Beaches.

Later he carried C. B. Harmon in same direction; distance about 17¾ miles. Track passenger flights did not equal his previous record.

Lieut. Paul W. Beck, of the Signal Corps, who was ordered to attend and report on the flights, was taken up with Paulhan for three circuits of the course, and an attempt made to throw bombs in a 20 ft. square at an altitude of about 250 ft. First bomb went 58 ft. over square and 47 ft. to right. Second went 113 ft. over. A third fell 66 ft. to the right of a line. Lieut. Beck had worked out a table on the distance before target that the bombs should be released, but in the calculations he had figured on the machine going at a higher speed than it did.

In trials for height Hamilton took honors, making a daring ascent of 530.5 ft. in 8 min. 04 2-5 sec.; in a second flight he went up to 455 ft., up 14 min. 53 2-5 sec. Hamilton tried again for endurance, but came down after 6.02 miles; up 11 min. 01 1-5 sec. In the one lap speed contest his time was 2 min. 47 2-5 sec.

Knabenshue and Beachy in a closely contested dirigible race, made new records for the course. Knabenshue, 5 min. 05 sec.; Beachy, 4 min. 57 4-5 sec.

After flying the new Gill-Dosh biplane more than a mile and a quarter, Hill. Beachy descended too abruptly and partially wrecked the beautiful machine. It was his first real flight, and he did very well, considering.

BALLOONS

J. C. Mars and five passengers, in the "Dick Ferris," 80,000, to Moneta Ave., 4 miles.

Geo. B. Harrison and three passengers, in the "Los Angeles," to Boyle Heights, 7 miles.

F. J. Kanne and two passengers, in the "Peoria," to near Huntington Park, 2 miles.

11th Day, January 20

CURTISS MAKES 1 HR. 24 MIN. FLIGHT

Curtiss on this, the last day of the meet, regained somewhat the good will of the audience, which had somehow, in the light of Paulhan's superior performances, grown a bit cold in its enthusiasm. Curtiss had made 33 1-5 laps (53.38 miles) in 1 hr. 25 min. 5 sec., when a broken rib on the machine forced him to descend, leaving Paulhan still flying. The Frenchman covered forty laps in 1 hr. 49 min. 40 4-5 sec., when darkness compelled him to descend. Curtiss lapped him several times.

Hamilton proved the most nervy of the Curtiss operators, ascending in a height trial to 754.6 ft. and then started out on an unofficial cross-country flight to Gardena and back, about 6 miles. On returning, his crankshaft fortunately broke when nearly in the grounds, and he glided from a height of about 200 ft. into the field, landing safely after a flight of 25 min. 30 sec.

Willard and Masson each made a flight, the latter in the old Farman.

BALLOONS

Clifford B. Harmon and Geo. B. Harrison, in the "New York," in a trial to set an official altitude record for Southern California, 11,100 ft. Descended at S. Hollywood. Distance 8 miles.

Prizes

Prizes announced as awarded by the judges are:

FOR HEIGHT

*$3,000—Louis Paulhan, 4,165 ft., 1st.
$2,000—Chas. K. Hamilton, 626 ft., 2nd.
$500—Not awarded.

ENDURANCE AND TIME

$3,000—Louis Paulhan, 75.77 miles, 1 hr. 58 min. 32 sec., 1st.
$2,000—Glenn H. Curtiss, 37.05 (12 pylons) miles, 1 hr. 25 min. 05 sec.
$500—Chas. K. Hamilton, 19.44 miles, 39 min. 2-5 sec.

SPEED, TEN LAPS

$3,000—Glenn H. Curtiss, 16.11 miles, 23 min. 43 2-5 sec., 1st.
$2,000—Louis Paulhan, 16.11 miles, 24 min. 59 2-5 sec., 2nd.
$500—Chas. K. Hamilton, 16.11 miles, 30 min. 34 3-5 sec., 3rd.

THREE LAPS, WITH PASSENGER

$1,000—Louis Paulhan, 4.83 miles, 8 min. 16 1-5 sec.
$500—No others contested. Not awarded.

FASTEST LAP

$1,000—G. H. Curtiss, 1.611 mile, 2 min. 12 sec., 1st.

SLOWEST LAP

$500—Chas. K. Hamilton, 1.61 miles, 3 min. 36 2-5 sec.

QUICKEST START FROM FIRST EXPLOSION

*$250—Glenn H. Curtiss, 6 2-5 sec., won.

START IN SHORTEST DISTANCE

*$250—Glenn H. Curtiss, 98 ft., won.

STARTING AND LANDING IN SQUARE

$250—Chas. F. Willard won.

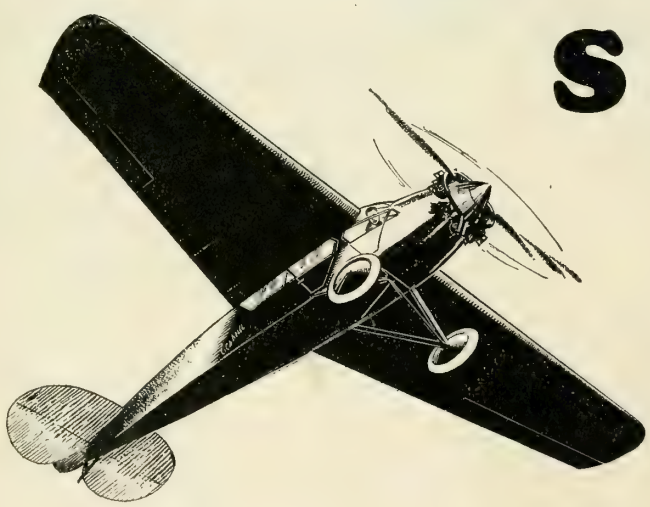
CROSS-COUNTRY

$10,000—Louis Paulhan, 45¼ miles, 1 hr. 02 min. 42 4-5 sec., won.

RECORDS FOR COURSE

*Height, 4,165 ft., Louis Paulhan, January 12.
Distance, 75.77 miles, Louis Paulhan, January 17.
Endurance, 1 hr. 58 min. 32 sec., Louis Paulhan, January 17.
Speed, ten laps, Glenn Curtiss, 23 min. 43 3-5 sec., January 17.
Speed, one lap, Glenn Curtiss, 2 min. 12 sec., January 14.
Speed, three laps, with passenger, Louis Paulhan, 8 min. 16 1-5 sec., January 13.
Slow speed, one lap, Chas. K. Hamilton, 3 min. 36 2-5 sec., January 14.
*Shortest distance in rising, Glenn Curtiss, 98 ft., January 11.
*Shortest time in rising, Glenn Curtiss, 6 2-5 sec., January 11.
Cross-country, Louis Paulhan, 45¼ miles.
Dirigibles, one lap, Lincoln Beachy, 4 min. 57 4-5 sec., January 19.
Height for dirigibles, Roy Knabenshue, 1,656.9 ft.
Height for balloons, Clifford B. Harmon, 11,100 ft.

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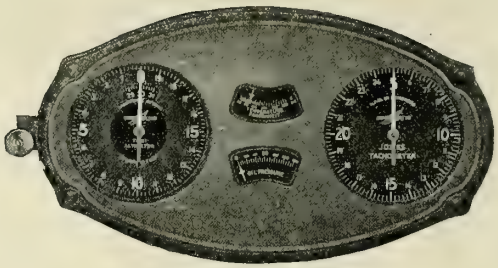
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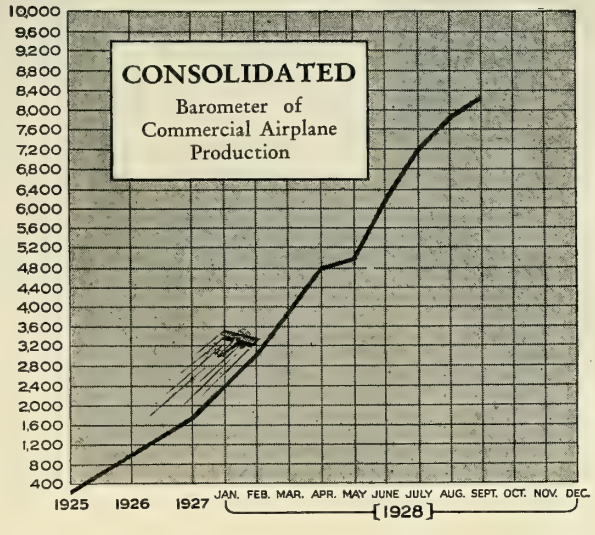
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ade Commercial Airplanes

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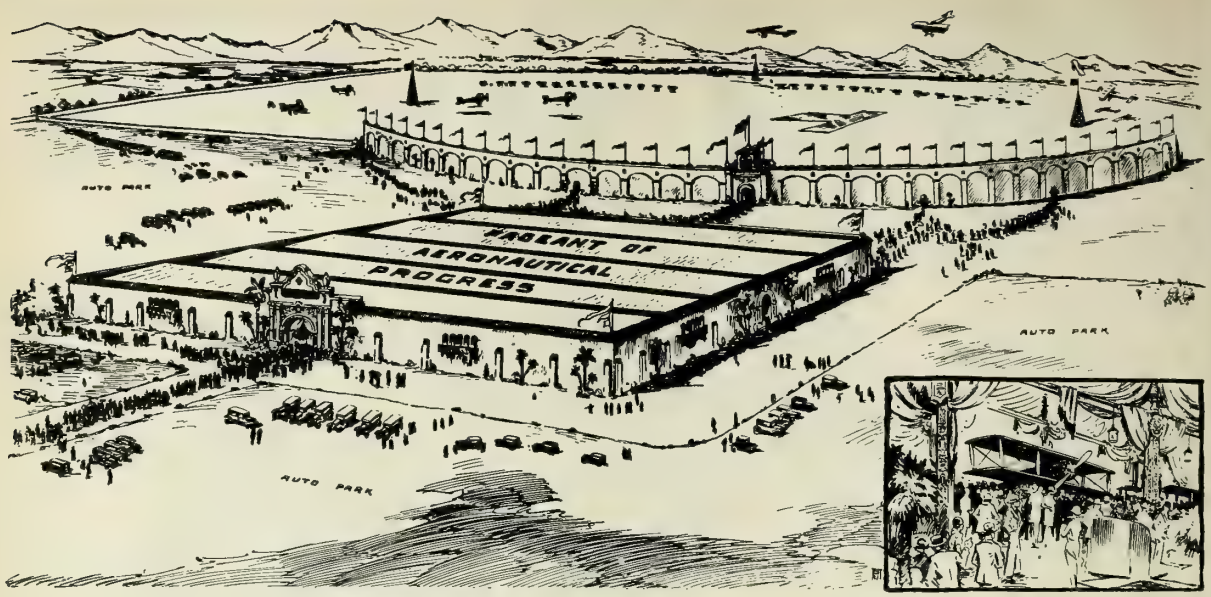
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1928 NATIONAL AIR RACES

MINES FIELD, LOS ANGELES, CALIFORNIA, SEPTEMBER 8 to 16

EIGHTEEN years ago the city of Los Angeles, California brought forth a new type of exhibition. When automobile racing was at its height in 1910 the first air races were staged at this city. It is interesting to note that the world's altitude record of 4,165 feet was established at these events. At the same show the winner of the endurance contest made a flight of a little less than two hours in which a distance of 75.77 miles was covered.

Since then, these records have reached such major proportions that they may no longer be considered in the light of a show event. Both of them entail too much preparation and special equipment.

The keynote of the modern aircraft show is efficiency of operation. The airplane owner and operator today requires speed, comfort and economy of operation. The transcontinental air derby from New York to Los Angeles has twice as many entrants as it had last year. Every airplane entered is capable of negotiating the distance from the Atlantic to the Pacific easily and without extraordinary hazard.



Sterling silver Aero Digest trophy

In order to house the exhibition of aircraft to be held in conjunction with the air races, Los Angeles has built an exhibition hall that will accommodate the displays of every manufacturer of aircraft and aircraft accessories. Mines Field was built especially for the air races. It has a total area of more than 2,000 acres and has every facility for the requirements of the contestants. A mammoth grandstand of unique design has been built to give the public an unobstructed view of the closed-field speed races around pylons and for the finish of the eight great air derbies from across the continent and nearby stations. To include all the features planned, morning, afternoon and night sessions will be staged, the program opening daily at 10 o'clock and concluding at 10 o'clock.

Consideration of the amount of the prize money offered for the races this year will give the reader a perspective of the growth of these events. In 1910 the total prize money did not total more than $20,000. This year the total approaches a quarter of a million.

The association is preparing to provide for hundreds of planes and some 4,000 pilots and their assistants during the big meet.

Theodore T. Hull is president of the California Air Race Association; Harry Wetzel, vice president; D. E. McDaneld, secretary-treasurer. In addition to the above, on the executive committee are Dr. T. C. Young, Dudley M. Steele and Robert J. Pritchard. Cliff Henderson is the capable and energetic managing director of the exposion.

On the following pages are the program of show and race events, a list of exhibitors and some of the products they are displaying at the exhibition hall during the air meet.



Barber and Baldwin merit trophy



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PROGRAM OF SHOW AND RACE EVENTS

International Aeronautical Exposition of airplanes and accessories open daily from 2 p.m. to 10 p.m.
Note: Program subject to change.

Saturday, September 8th

Afternoon
1:00—Band concert.
1:30—Parade of 300 airplanes. Start of meet.
2:30—Return of airplane parade.
3:00—Field parade of 300 airplanes.
3:30—Three special Navy events.
4:00—Al Wilson's pusher exhibition.
4:30—Army stunts.
5:00—Balloon jump.
Evening
7:00—Band concert.
Start of endurance flights.
7:30—Film companies.
8:30—Demonstration of parachute flares.
9:00—Al Wilson. Fireworks.

Sunday, September 9th

Afternoon
1:30—Band concert.
2:00—Around-the-World memorial flight.
2:30—Army parachute jumping.
3:30—Navy stunts.
4:00—Al Wilson.
4:30—Army stunts.
5:00—Balloon jump.
Evening
7:00—Band concert.
7:30—Movie company.
8:30—National Guard fireworks display. Parachute flares.
9:00—Al Wilson.

Monday, September 10th

FINISH OF TRANSCONTINENTAL CLASSES "A," "B" AND "C" RACES

Afternoon
1:30—Band concert.
2:30—Dead stick landing contest.
3:30—Navy stunt flying.
4:00—Al Wilson.
4:30—Army stunt flying.
5:00—Balloon jump.
Evening
7:00—Band concert.
8:30—Parachute flares.
9:00—Al Wilson. Fireworks.

Tuesday, September 11th

FINISH OF PAN-AMERICAN RACE
FINISH OF CALIFORNIA CLASS "A" RACE—(SAN FRANCISCO TO LOS ANGELES)

Afternoon
1:30—Navy band concert.
2:00—Smoke screen demonstration.
2:30—Formation flying, Marine Corps.
3:00—Falcon race, Marine Corps.
3:30—Dropping bombs to targets. "Lufbery Circle" formation flying.
4:00—Diving, bombing, formation flying.
4:30—Parachute jump by Marine Corps.
5:00—Navy stunt flying exhibition.
Evening
7:00—Band concert.
8:00—Navy night exhibition.
9:00—Al Wilson. Fireworks.

Wednesday, September 12th

ARMY DAY

FINISH OF INTERNATIONAL RACE
FINISH OF CALIFORNIA CLASS "B" RACE—(OAKLAND TO LOS ANGELES)

Afternoon
1:30—Army band concert.
2:00—Army dead-stick landing contest.
2:30—Army formation flying.
3:00—Special Event No. 7—John L. Mitchell trophy race.
4:00—Special Event No. 6—General Mason M. Patrick trophy race.
4:30—Army bombing and formation flying.
Evening
7:00—Army band concert.
8:30—Army night program.
9:00—Al Wilson.

Thursday, September 13th

"FAMOUS FLIERS DAY"
FINISH OF TRANSCONTINENTAL NON-STOP RACE—(NEW YORK TO LOS ANGELES)

Morning
California model aircraft exhibition.
Airplane model flying contest.

Afternoon
1:30—Band concert.
2:00—Introduction of famous fliers.
2:30—Event No. 1—Relay race, civilians only. B. H. Dyas Co. trophy.
3:30—Event No. 8—Army and Navy observation type airplane race. (125 miles). Liberty Engine Builders trophy.
4:30—Event No. 2—Free For All, civilians only. West Coast Theatres trophy.
5:00—U. S. Army fighting airplane stunting. U. S. Navy formation flying.
Evening
7:00—Band concert.
8:00—Show.
8:30—Parachute flares.
9:00—Al Wilson.

Friday, September 14th

CLOSED COURSE EVENTS FOR COMMERCIAL PLANES
CLOSED COURSE EVENTS FOR ARMY PLANES
PARACHUTE JUMPING—ARMY
STUNTS AND FORMATION FLYING—ARMY



Crack Navy stunt team. Left to right: Lieutenants Davis, Tomlinson and Storrs.

Afternoon
12:45—Band concert.
1:30—Event No. 4—Free For All, civilians only. A. C. Spark Plug trophy.
2:00-3:00—Event No. 9—Navy pursuit plane race. California Air Race Association trophy.
3:00-4:00—Event No. 15—Light airplane speed and efficiency contest, civilians only.
4:00-5:00—Event No. 11—National Guard race.
5:15—Special Event No. 3, Airplane model building contest.
Evening
7:00—Band concert.
7:30-8:30—Show.
8:30—Parachute flares.
9:00—Al Wilson.

Saturday, September 15th

CLOSED COURSE RACES FOR COMMERCIAL AND NAVY PLANES
PARACHUTE JUMPING, NAVY

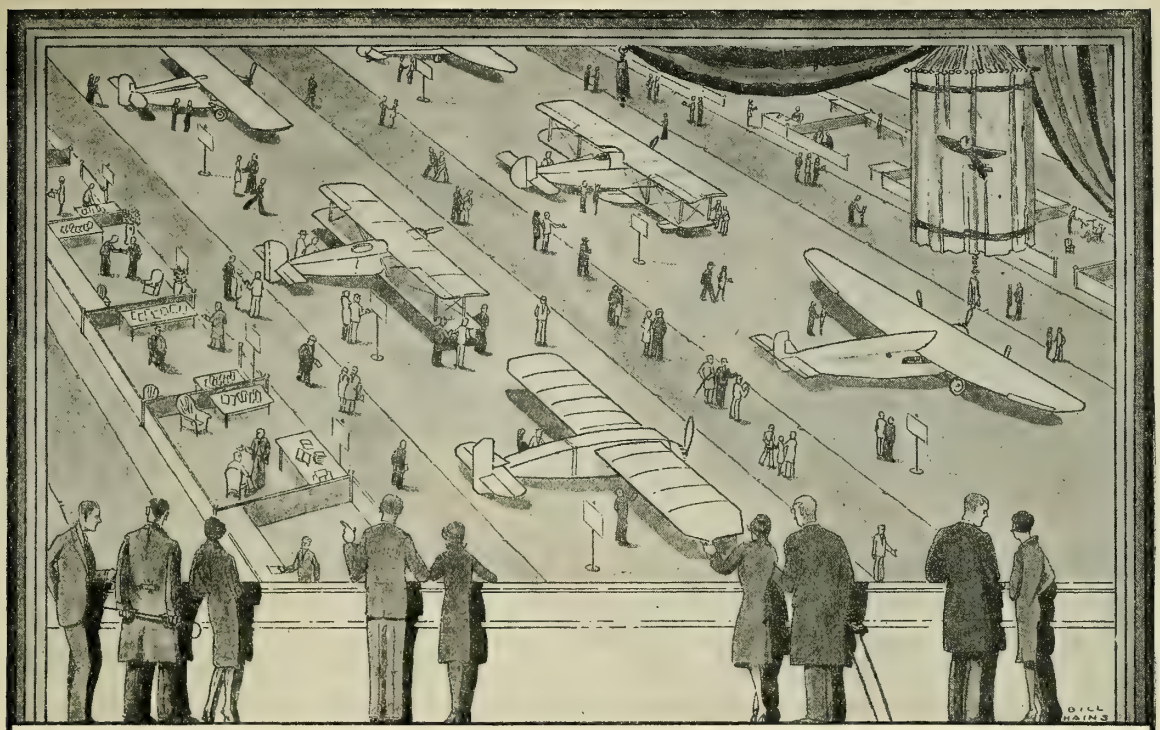
Afternoon
1:00—Band concert.
1:30—Event No. 5—Free For All, speed and efficiency contest, civilians only. (100 miles). Aviation Town and Country Club trophy.
2:30—Army stunts.
3:30—Event No. 6—Free For All, civilians only. Detroit News Air Transport trophy.
5:00—Event No. 14—National Guard, Army and Navy Reserve PT training type airplane race.
5:30—Army and Navy attack. Balloon formation. Balloon "busting". Parachute jumping.
Evening
7:00—Band concert.
7:15—Speaker.
9:00—Al Wilson.

Sunday, September 16th

CLOSED COURSE RACES FOR COMMERCIAL PLANES
FINALS IN ARMY AND NAVY PURSUIT PLANES
FINALS IN PARACHUTE CONTEST
DESTRUCTION OF "VILLAGE" BY ARMY AND NAVY PLANES
STUNTS BY FAMOUS PILOTS OF ARMY AND NAVY

Afternoon
1:00—Band concert.
1:30—Event No. 12—Free For All military pursuit race (any motor—100 miles). Trophies: 1st, AERO DIGEST. 2nd, Douglas Company.
2:30—Civilian stunting.
3:00—Navy stunting. Three special events.
3:30—"Village" blown up by Army and Navy.
4:00—Event No. 7—Parachute jumping contest. Russell Parachute Co. trophy.
5:00—Special Event No. 5—Marine Observation Squadron No. 8 (50 miles—10 laps over 5-mile course).

Barber and Baldwin trophy and $250 will be awarded for the most meritorious flying performance during the meet.



ALL EYES ON AEROL STRUTS
At the INTERNATIONAL EXHIBITION

THE outstanding performance of the Aerol Strut equipped ships that competed in the National Air Races will make these shock absorbing landing gears the high spot of the exhibition.

On every hand these beautiful and efficient telescoping struts will be seen on outstanding makes of ships. At the booth of the manufacturer they will be displayed in detail.

No other product has contributed so much to safe, comfortable landings and protection to the ship, as have Aerol Struts. The product of the two million dollar Cleveland Pneumatic Tool organization with a proven record of engineering efficiency, these struts will inevitably grow with the industry and continue to be a dominant factor in safety and economy.

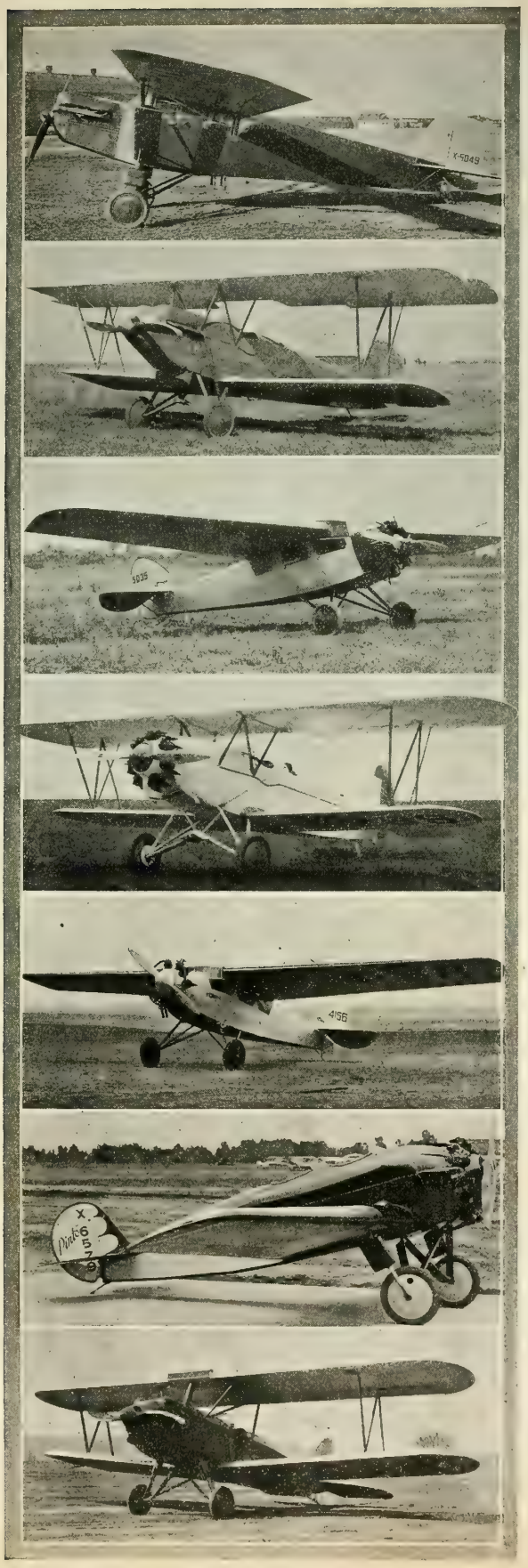


THE CLEVELAND PNEUMATIC TOOL CO.

3735 E. 78th St. Cleveland, Ohio

Also manufacturers of Cleco-Gruss and Cleco-Westinghouse Air springs for buses, trucks and automobiles.

AEROL *shock absorbing* STRUT



SUMMARY OF TRANSCONTINENTAL AND CLOSED COURSE AIR RACES AND FIELD EVENTS OF THE 1928 NATIONAL AIR RACES

Mines Field, Los Angeles, California, September 8-16

TRANSCONTINENTAL AIR RACE NEW YORK TO LOS ANGELES

(Civilians only)

Total Cash Prizes, $40,000; Trophies; and Sweepstakes Prize, $5,000.

$4,000 to be awarded to the two ships making the shortest elapsed time regardless of cubic inch displacement of motor, or type of ship.

$1,000 to first multi-motored plane to finish.

Class "A"—$10,000. Trophies—1st, May Company, Los Angeles; 2nd, Popular Aviation

Open to all type ships powered with motors of 510 cubic inches displacement or less.

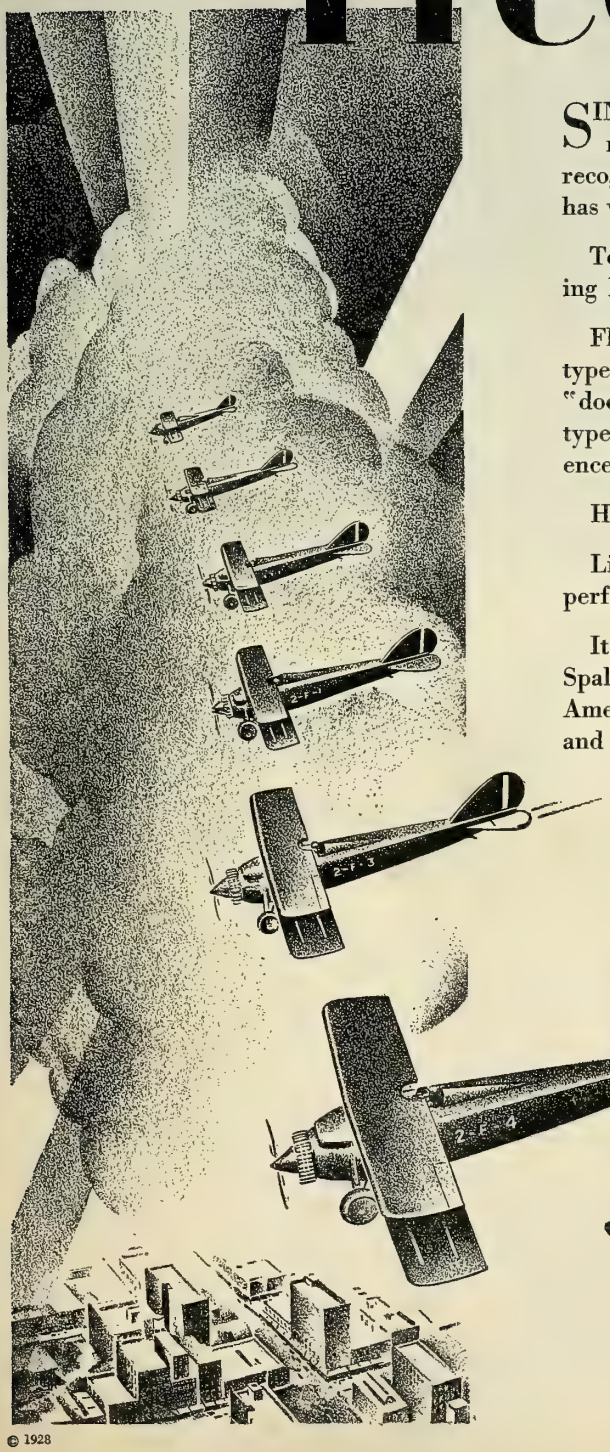
Winner	$5,000	Fourth	$700
Second	2,500	Fifth	500
Third	1,000	Sixth	300

Entries	*Plane*	*Engine*
James S. Charles	Eaglerock	Curtiss OX5
Curtiss-Robertson Airpl. Co. Dan R. Robertson, Pilot	Robin	Curtiss OX5
Curtiss-Robertson Airpl. Co. Stancel P. Gilley, Pilot	Robin	Curtiss OX5
Paul Datos Charles	Berliner monoplane	Curtiss OX5
George L. Bennett	Eaglerock	Curtiss OX5
Fischer & Jacobs, Inc. A. R. Jacobs, Pilot	Waco-10	Fischer & Jacobs
Joseph A. Nowicki	Mohawk Pinto	Warner
W. H. Emery, Jr.	Travel Air	Warner
George W. Brill	Travel Air	Curtiss OX5
Berliner Airc. Co., Inc.	Berliner monoplane	Curtiss OX5
Eugene J. V. Detmer	Travel Air	Curtiss OX5
John E. Carberry	DeHavilland Moth	Cirrus
Gordon MacKenzie	Waco-10	Curtiss OX5
Rainbow Aviation Co.	Challenger	Curtiss OX5
Stanley Airways, Inc. A. H. Stanley and R. Haynes, Pilot	Waco-10	Curtiss OX5
Arthur W. Killips	Waco-10	Curtiss OX5
Gerbracht Aero. Corp. Wilford Gerbracht, Pilot	Travel Air	Curtiss OX5
Don Phillips	Challenger	Curtiss OX5
Louis Derryberry	Travel Air	Curtiss OX5
Theodore Kenyon	Challenger	Warner
Sebastian Pond	Challenger	Curtiss OX5
S. J. Wittman	Pheasant	Curtiss OX5
Lt. Clinton Burrows	Thunderbird	Curtiss OX5
Leslie C. Miller	Lincoln-Page	Curtiss OX5
Tex Rankin	Waco-10	Curtiss OX5
International Airc. Corp. H. A. Speer, Pilot	International F-17	Curtiss OX5
Douglas H. Davis	Travel Air	———
Cessna Aircraft Co. Earl Roland, Pilot	Cessna	Warner
International Airc. Corp. J. Dixon Davis, Pilot	International F-17	Dayton Bear
Mohawk Airc. Corp. Walter E. Nicol, Pilot	Mohawk Pinto	Warner

(Continued on next page)

At the left are shown some of the airplanes competing in the "Class A" Transcontinental Air Race. From top to bottom the types illustrated are as follows: Curtiss Robin, Travel Air (OX5 engine), Cessna, Travel Air (Warner engine), Cessna (Anzani engine), Mohawk, International F-17 (OX5 engine).

Precision



SINCE those early days when Spalding first made flying equipment – – Spalding has recognized the need for *precision.* And Spalding has worked, painstakingly, to develop it.

Today, each individual piece of Spalding Flying Equipment is suited exactly to its purpose.

Flying Suits? Spalding has developed many types – – each type precisely correct. No senseless "doodads". No encumbering contrivances. Each type contains just those features which experience has proved necessary.

Helmets? Gloves? Shoes?

Likewise *precise!* Likewise developed to suit perfectly the need.

It is this attention to precision which has made Spalding flying equipment the choice of every American trans-Atlantic and trans-Pacific flyer – – and a host of other eminent aviators.

Spalding offers a *complete* line of flying equipment. Write to any of our offices, and we'll gladly send you a catalog. A. G. Spalding & Bros., New York, Chicago, Detroit, San Francisco, and Wright & Ditson, Special Distributors, 344 Washington St., Boston, Mass.

A. G. Spalding & Bros.

If you are going to the National Air Races and Aeronautical Exposition at Mines Field, Inglewood, Los Angeles, Sept. 8th to 16th inclusive, be sure to make your headquarters at Spalding's exhibit, Booths 41, 42, 43.

© 1928



Arthur Killips | Walter E. Nicol | Leslie C. Miller | Jos A. Nowicki | George W. Brill



L. Miller | Wilford Gerbracht | Albert R. Jacobs | Eugene J. V. Detmer | W. H. Emery | G. C. Quick



Tex Rankin | H. A. Speer | Doug Davis | James S. Charles | Earl Roland



Some of the pilots (above) and three more of the airplanes competing in the "Class A" race. The planes are: (top to bottom) Lincoln Page (Hispano engine); Thunderbird, and International with Dayton "Bear" engine.



Stancel P. Gilley | Clinton Burrows | Dan Robertson

(Continued from preceding page)

George Zinn, Jr. and George Hand	Challenger	Curtiss OX5
J. W. Hunt	Lone Eagle	———
Robert Dake and Theodore Tane	American Moth	Warner
A. H. Kreider	Challenger	Curtiss OX5
A. K. Owen	Pitcairn PA-4	Curtiss OX5
M. E. Grevenberg	Lincoln-Page	Curtiss OX5
Stuart Chadwick	Waco-10	Curtiss OX5

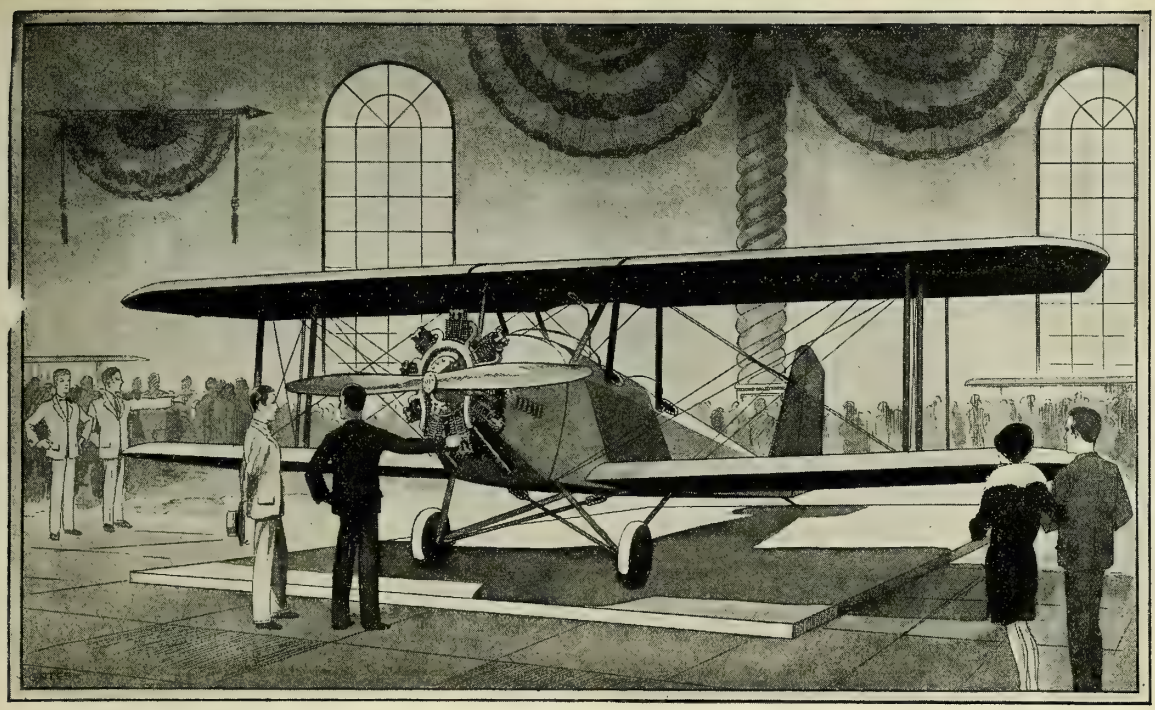
Class "B"—$15,000. Trophies.

Open to all type ships powered with motors of more than 510 but not to exceed 800 cubic inches displacement.

Winner	$7,000	Fourth	$1,000
Second	3,500	Fifth	700
Third	2,500	Sixth	300

Entries	*Plane*	*Engine*
H. C. Lippiatt	Travel Air	Wright Whirlwind
Graham Gounty Chamber of Commerce C. W. Mayse, Pilot Northwest Airways	Waco-10	Wright Whirlwind

(Continued on page 484)



In its class . . .

The *SAFEST* Airplane

THE FUTURE of flying depends on SAFETY. Flying is considered by many to be less safe than normal land transportation. Yet, if it is made as safe as *humanly possible*—if every unnecessary risk is eliminated—there is no question that it will be accorded universal acceptance as a mode of transportation.

Recognizing these facts, SPARTAN engineers set out, several years ago, to produce a plane of *maximum attainable safety*. That SPARTAN has taken long steps in this direction we now claim and *can prove*. That SPARTAN is the safest plane in its class we definitely *assert*.

The superior BALANCE of the SPARTAN Airplane represents our greatest achievement. The designers of SPARTAN, in attaining SPARTAN balance, have demonstrated a mastery of the science of aerodynamics hitherto unapproached. In the SPARTAN, travel of the center of gravity at varying loads has been reduced practically to zero, as load is carried directly on the ship's center of gravity.

The results, in safety, have been stupendous. More than 100 expert pilots have tried to force the SPARTAN into a tail spin, with power both on and off—without success. "It simply WON'T spin," is their verdict. The ship is also practically stall-proof, as when it reaches the stalling point it very slowly drops its nose and starts forward again. Further and final evidence of its hitherto unapproached balance is that with all controls released it tends to return automatically to a horizontal, straight-ahead position—in other words, it rights and flies itself.

The obvious safety factors of (1) highest grade and most durable materials, exhaustively tested to guard against all flaws: (2) sturdy, dependable construction, tested at every stage; (3) simple and dependable control; (4) reliable instruments; and (5) powerful, reliable motor—have all had the painstaking attention of SPARTAN'S builders. In these respects SPARTAN is unsurpassed.

Capacity 3 persons and baggage; cruising speed 100 miles per hour; cruising range 600 miles; motor 120 H. P. Walter. Visit our display at the Los Angeles Air Races and Exposition, September 8 to 16, and allow our representatives to point out to you, in detail, SPARTAN'S safety features. Fully descriptive literature on request.

SPARTAN AIRCRAFT COMPANY

Tulsa, Oklahoma

The VERDICT — of National Air

The least that can be said of Berry's Aircraft Finishes is that all Stinson planes are protected and beautified almost exclusively by them.

Edward A. Stinson

President, Stinson Aircraft Corp.





Many experiences with leading makes of airplane finishes have convinced me of the superiority of Berry Brothers' products. I shall specify them on all my ships in the future.

John P. Wood.

Pilot of Winning Waco 10
President, Northern Airways

This tour has been a big strain on materials as well as pilots. It is a pleasure to state that Berry's dopes and lacquers have given unexcelled results.

R. G. Page.

Chief Test Pilot, Stinson Aircraft Corp.





My Caminez-engined Travel Air has the durable Berryloid finish that is standard on all these ships.

J. Wilson Kelly

Fairchild-Caminez Engine Corp.



All Ford tri-motor planes are protected inside with Lionoil Prussian Blue. Aircraft Berryloid is used on the exterior of many jobs where colors are desired.

Frank McHawks

Pilot, Texaco Ford Tri-Motor



I have tested all makes of pigmented airplane dopes and lacquers and still consider Aircraft Berryloid the leader in this field.

Chas. W. Meyers

Chief Test Pilot, Advance Aircraft Co.



I have flown Berryloid-finished planes from Mexico as far north as the polar regions with Wilkins and at all times have been proud of these unexcelled paint jobs.

Alger Graham

Pilot for Wilkins 1927
Buhl Airster Entry in Tour



I wish to compliment you on the appearance of the Berryloid-finished airplanes in the Tour.

George W. Haldeman

Schlee-Brock Aircraft Corp.



The Berryloid finish on the Pride of Detroit is as good as new. Besides flying from New York to Japan it has gone thousands of miles in commercial service.

William J. Brock.

Schlee-Brock Aircraft Corp



My Stinson-Detroiter looks as good as the day it left the factory. We have no worries with Berry products.

H. P. Bowers

Pilot, Stinson-Detroiter

Tour Pilots



"UNEXCELLED paint job"....."Berry products adopted exclusively"....."unexcelled results"....."nothing equal to Lionoil"....."finish as good as new"—nothing that we can say could more conclusively prove the effectiveness of Berry Brothers' Progressive Aircraft Finishes.

You know these men—by reputation at least. Surely their judgment is sound and mature. Please read these opinions, weigh the evidence carefully, and render your own verdict.

Let us emphasize these points. Berry Brothers is everlastingly at it trying to improve Progressive Aircraft Finishes, already voted best obtainable. The services of an expert aircraft finisher are always at the disposal of manufacturers seeking the utmost in protection and beauty for their ships.

See the Berry Brothers' exhibit of Progressive Aircraft Finishes at the Aeronautical Exposition, Los Angeles, Sept. 8-16, and the Berry Brothers' plane entered in the class B New York to Los Angeles Air Derby and the National Air Races.



The Monocoupes on the Tour still look and fly like new at the end of this gruelling trip. The orange and black Berryloid combination is ideal.

Atkinson Aviation Co.



The finish of Berryloid on my Travel Air has given wonderful satisfaction for many months under varied conditions of severe exposure.

Tucson, Arizona



We certainly compliment you on the durability of your finishes as used on the Monocoupe.

Midsouth Airways
Monocoupe distributors



The Buhl Aircraft Co. have adopted Berry products exclusively because our planes are built to the highest standard.

Sales Manager, Buhl Aircraft Co.



We have used large quantities of Lionoil in our laminated wood construction and have found nothing equal to it for protecting and sealing the wood against moisture.

Chief Test Pilot, Lockheed Aircraft Company



Since adopting Lionoil and Berryloid the Alexander Aircraft Co. have had no more finishing troubles. We are always assured of the best.

Chief Test Pilot,
Alexander Aircraft Co.



The Aircraft Berryloid finish on my Stearman has been admired by aircraft enthusiasts from coast to coast. It is as beautiful as the day it left our factory.

Chief Test Pilot, Stearman Aircraft Co.



PROGRESSIVE AIRCRAFT FINISHES

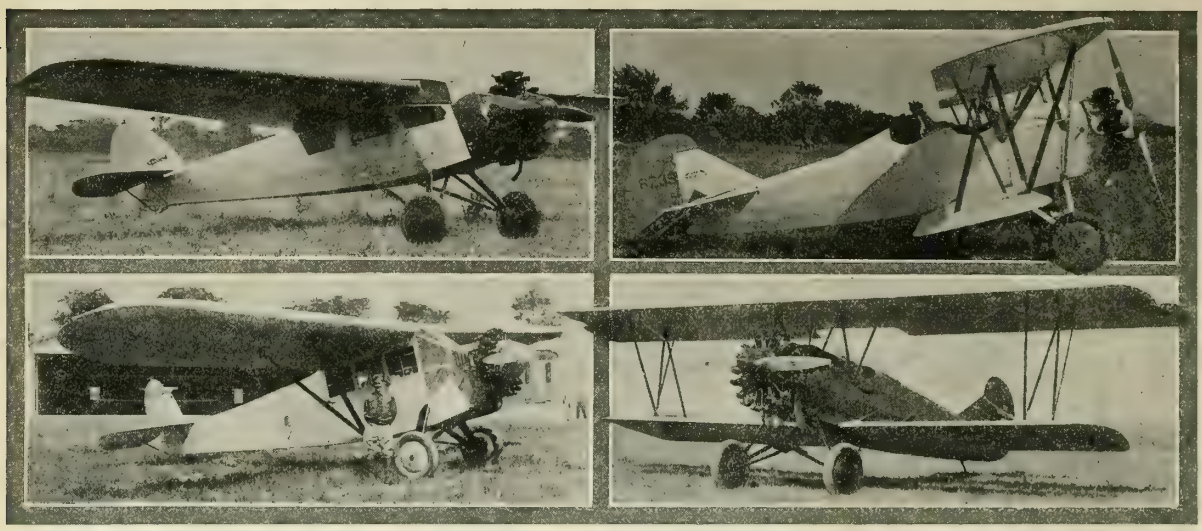
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Varnishes Enamels and Lacquers
Detroit, Michigan *1858—70th Anniversary—1928* *Walkerville, Ont.*

Manufacturer of Progressive Aircraft Finishes

Say you saw it in AERO DIGEST

Some of the planes and pilots in the "Class B" Transcontinental Air Races



Matthew Whitin Whittall—Fairchild. Above, Cessna. Whirlwind Travel Air. Above, Newest Travel Air Whirlwind.



E. E. Ballough | Paul Braniff | Francis Bowhan | C. W. Mayse | H. C. Lippiatt | C. W. Holman

(Continued from page 480)

C. W. Holman, Pilot	Laird LC-R	Wright Whirlwind
Matthew Whitin Whittall	Fairchild	Wright Whirlwind
Reginald Sinclaire	Eaglerock	Curtiss C-6
Paul Braniff	Travel Air	Wright Whirlwind
Texas Company	Lockheed Vega	———
J. Warren Smith and Al Litzenberger	Cessna	Wright Whirlwind
Howard Hawks	Travel Air	———
E. M. Laird Co.		
E. E. Ballough, Pilot	Laird LC-R	Wright Whirlwind
Overland Tire & Rubber Co.		
Francis Bowhan, Pilot	Cessna	Wright Whirlwind
Cessna Aircraft Co.		
G. C. Quick, Pilot	Cessna	Anzani
Lee Nomis	Travel Air	Wright Whirlwind
Charles W. Meyers	Waco-10	Wright Whirlwind
Stuart F. Auer	Waco-10	Wright Whirlwind
John Livingston	Waco-10	Wright Whirlwind
Edward G. Schultz	Cessna monoplane	Wright Whirlwind
Jay Sadowsky	Cessna Model B	Wright Whirlwind
Ive McKinney	Pacer	Wright Whirlwind
J. P. Livermore	Stinson	Wright Whirlwind
John P. Wood	Waco	Wright Whirlwind

Class "C"—$10,000. Trophies—1st, Elizabeth C. T. Miller.

Open to all type ships powered with motors of more than 800 ubic inches displacement, either single, bi-, or tri-motored ships.

Winner	$5,000	Fourth	$700
Second	2,500	Fifth	300
Third	1,500		

Entries	*Plane*	*Engine*
A. E. Humphreys, Jr.		
Ed. J. Brooks, Pilot	Fokker Universal	Pratt & Whitney Wasp
Erle P. Halliburton		
Bob Cantwell, Pilot	Lockheed Vega	Pratt & Whitney Wasp
Thomas Colby		
Lee Schoenhair, Pilot	Buhl Airsedan	Wright Whirlwind

(Continued on next page)



A. E. Humphreys | "The Faun" Fokker monoplane in the "Class C" race. Edw. J. Brooks (pilot) | Mrs. Humphreys





"Our Landing Field Improved 100%"—

Teterboro Airport

IT is of importance that every aviation field have the very best drainage possible. Every hour that it is unsuitable for take-off and landing purposes, after heavy rains, interferes with its usefulness and, ultimately, with its earning powers.

"Poroswall" Rapid Drain Pipe is the ideal drain for aviation fields. It has ten times the drainage capacity of other pipes because water seeps into it throughout its entire wall-area, not merely at spaces left between sections, as in the case of ordinary drain pipe. As a matter of fact, it is laid with tight joints, so that foreign matter is kept out of its interior. This also means perfect alignment and better flow-conditions within.

Read what Teterboro Airport has to say after installing more than 10,000 feet:

Teterboro Airport, Inc.
"The Airport of New York"
Walker Cement Products, Inc.
Little Ferry, N. J.

Gentlemen:

We have used over 10,000 ft. of "Poroswall" Rapid Drain Pipe in connection with the drainage of Teterboro Airport and its efficiency as a drainage pipe far exceeds our expectations.

A considerable quantity of French drain tile was installed at the airport a year or so ago and at the beginning of the year the drainage system became very unsatisfactory and, upon removing some of the French tile, we found that silt and other foreign matter had entered at the joints in some instances nearly filling the pipe.

We have since removed the French tile and substituted "Poroswall" and, *since its installation, our landing field has improved 100 per cent.* and is ready for use in less than one-quarter the time previously required to drain it with French tile after a rainfall.

The rapidity with which "Poroswall" can be installed is certainly worthy of mention; a recent test proving that *its installation requires less than one-fifth of the time* consumed in the installation of other types of drain tile.

The other sections of the airport will be equipped with "Poroswall" just as soon as conditions permit its installation.

Very truly yours,
TETERBORO AIRPORT, INC.,
(signed) Paul Dewaal, *Field Manager.*



Inquiries and Requests for Estimates Solicited.

WALKER POROSWALL RAPID DRAIN PIPE
Walker Cement Products, Inc.
Little Ferry, N.J.
Plants at Little Ferry, N.J. & Baldwin, L.I., N.Y.

Some of the pilots and airplanes entered in the Transcontinental Air Races



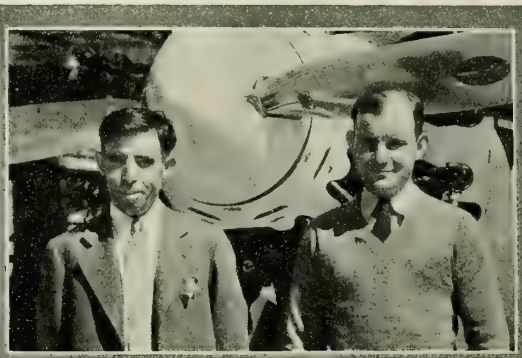
Fairchild Monoplane—Pratt & Whitney Wasp engine



Charles B. D. Collyer



Thomas B. Colby



Erle P. Halliburton



Bob Cantwell

Lee Schoenhair

(Continued from preceding page)

Fairchild Aviation Corp.

C. B. D. Collyer, Pilot	Fairchild	Pratt & Whitney Wasp
Charles F. Rocheville	Albatross	Menasco
Capt. Richard Duncan	Cox-Klemin	Liberty

TRANSCONTINENTAL NON-STOP RACE NEW YORK TO LOS ANGELES

Prizes—$22,500. Trophies—1st, Airway Age
2nd, Colleen Moore

Open to all type ships powered with any type motor. Cubic inch displacement unlimited.

Winner	$12,500	Third	$3,000
Second	6,000	Fourth	1,000

Entries	*Plane*	*Engine*
Owen I. Haughland	Cessna	Wright Whirlwind
Mamer Flying Service Nick B. Mamer, Pilot; C. Paulsen, Co-pilot	Buhl Airsedan	Wright J5B
William Thaw, 2nd Harry Tucker	Lockheed Vega	Pratt & Whitney Hornet
Arthur Goebel, Pilot	Lockheed Vega	Pratt & Whitney Wasp
Clifford E. McMillin Oliver C. LeBoutillier	Stinson	Wright Whirlwind
George E. King	Bellanca	Wright Whirlwind

(Continued on next page)



Nick B. Mamer



Buhl "Special Airsedan" with Wright Whirlwind engine



Clarence F. Paulsen

All that you ought to know about AVIATION



A Comprehensive Course in every phase of this great industry

COMPLETE IN TWO VOLUMES

JUST send this coupon for a five day study of the most comprehensive aviation course ever written—all to be known about the entire industry—condensed by an expert and comprehensively explained and illustrated in two magnificent volumes.

For Beginners, Experts, Students, Fliers, Mechanics, Builders and Owners
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By Major V. W. Pagé
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Teaches aviation from beginning. Gives and answers 600 important questions. Excellent for laymen and beginners. Gives complete information necessary for U. S. Government license. Explains every problem up to first trial flight. Indispensable to students and learners.
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By Major V. W. Pagé
U. S. Air Corps Reserve

Used as authentic reference and text book in more than a hundred aviation schools. Invaluable to pilots, mechanics, and officials. Explains every aircraft detail—engines, instruments, flying, airports, modern planes, etc. Up to the minute. 855 octavo pages. 400 illustrations. 23 tables. Price $5.00.

Major Victor W. Pagé, a distinguished technical engineer, flier and instructor, gives from his years of experience all the information necessary in connection with modern aviation. 1102 pages. 540 illustrations. Two great books. The advanced flier uses them as an authoritative reference; more than a hundred schools use them for text books; beginners use them to get the background and groundwork necessary for an intelligent start in any branch of aviation.

Teaches the Flier and the Builder All the Facts

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NORMAN A. HENLEY PUB. CO.
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* **Say you saw it in AERO DIGEST**



Harry J. Tucker — The Lockheed Vega, "Yankee Doodle", entered in the Non-Stop Transcontinental. — Arthur Goebel

INTERNATIONAL AIR RACE
WINDSOR, CANADA TO LOS ANGELES

Prizes—$10,000. Trophies.

Open to all type ships powered with motors of 800 cubic inches displacement or less, piloted by citizens of Canada only.

Winner	$5,000	Fourth	$700
Second	2,500	Fifth	500
Third	1,000	Sixth	300

Entries	*Plane*	*Engine*
H. R. Campbell and K. E. Whyte	DeHavilland Moth	Cirrus Mark II



H. R. Campbell and K. E. Whyte with their DeHavilland "Moth"

PAN-AMERICAN AIR RACE
MEXICO CITY TO LOS ANGELES

Prizes—$10,000. Trophies

Open to any type ship, using any type motor. All ships to be piloted by citizens of Latin-American countries only.

Winner	$5,000	Fourth	$700
Second	2,500	Fifth	500
Third	1,000	Sixth	300

CALIFORNIA AIR RACE

Class "A"—San Francisco to Los Angeles

Prizes—$2,000. Trophies—1st, San Francisco Junior Chamber of Commerce. 2nd, Harry Sperl

Open to all type ships powered with motors of 510 cubic inches displacement or less.

Winner	$1,000	Fourth	$150
Second	500	Fifth	100
Third	250		

Entries	*Plane*	*Engine*
Curtiss-Robertson Airpl. Mfg. Co.	Robin	Curtiss OX5
Gordon Keith MacKenzie	Waco-10	——
C. S. Hurtt	Lincoln-Page	Curtiss OX5
Clinton Burroughs	Thunderbird	Curtiss OX5
H. S. Myrhes	Simplex	——
MacMillan Petroleum Products and Martins Airport	Eaglerock	——
Charles Dycer	Lincoln-Page	Curtiss OX5
E. Burrell Smith	Eaglerock	——
A. E. Cameron	Eaglerock	——
Western Air Transport Co.	Thunderbird	——

Class "B"—Oakland to Los Angeles

Prizes—$3,000. Trophies—1st Oakland Chamber of Commerce. Special Hearst Pacific Coast Cup

Open to all type ships powered with motors of greater than 510 cubic inches but not to exceed 800 cubic inches displacement.

Winner	$1,250	Fourth	$300
Second	800	Fifth	150
Third	500		

Entries	*Plane*	*Engine*
H. C. Lippiatt	Travel Air	——
A. E. Cameron	Eaglerock	——
D. C. Warren	Travel Air	——
Howard Hawks	Travel Air	——

CLOSED COURSE RACES AND EVENTS

SPECIAL EVENT NO. 1

Breaking World's Airline Distance Record

Prize—$5,000 in cash. Trophy

SPECIAL EVENT NO. 2

Breaking World's Endurance Record

Prize—$5,000 in cash. Trophy

SPECIAL EVENT NO. 3

Airplane Model Building Contest

Prizes—$750. Trophies

Open to any boy or girl of 18 years or under who is a resident of the State of California.

SPECIAL EVENT NO. 4

Airplane Model Flying Contest

Prizes—$750. Trophies

Open to any boy or girl of 18 years of age or under.

SPECIAL EVENT NO. 5

Marine Observation Squadron No. 8

50 mile race, 10 laps over 5-mile course. Closed event for this squadron.

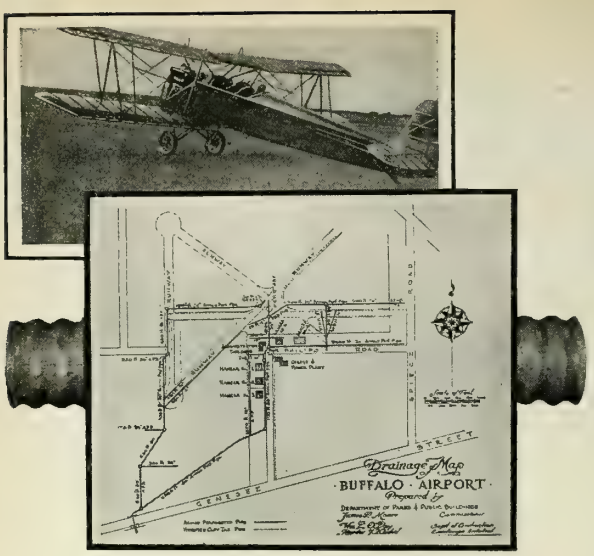
(Continued on next page)

The Consolidated Courier



Consolidated Aircraft Corporation
Buffalo, N.Y.

CONSOLIDATED AIRCRAFT



Does *dependable drainage* safeguard your airport?

PILOTS, designers and officials agree that the feature most essential for a successful airport is Safety. Hazards must be reduced to those beyond human control.

In landings and departures safety depends on a field kept constantly firm and dry by correct, unfailing drainage. This important safeguard for your enterprise is afforded only by construction characterized by strength, efficiency and dependability.

An increasing number of leading airports have found in Armco Perforated Iron Pipe the assurance of Safety so necessary for the protection of the pilots, their planes and the passengers or mail they carry. Buffalo, illustrated above, is an example of an airport designed for safety and convenience in every detail.

Put your community in the front rank with an airport that is safe, efficient, successful. Armco engineers will be glad to assist you with suggestions or recommendations.

ARMCO CULVERT MFRS. ASSOCIATION
Middletown, Ohio

ARMCO
Perforated
PIPE

SPECIAL EVENT NO. 6
Race for Attack Type Planes
For Mason M. Patrick Trophy

(Closed event for pilots of Third Attack Group.)
Distance 120 miles, 12 laps over 10-mile course.
Number of contestants—minimum 4; maximum 20.

Entries

From Fort Crockett:
Major John H. Jouett, P-589
Captain Ralph H. Wooten, P-254
Captain Horace N. Heisen, P-348
Lieut. John G. Williams, P-443
Lieut. George A. McHenry, P-585
2nd Lieut. Ivan M. Palmer, P-1210
2nd Lieut. Earl C. Robbins, P-1201
2nd Lieut. Otto C. George, P-1204
2nd Lieut. Walter W. Gross, P-1203
2nd Lieut. Herbert M. Newstrom, P-1209
2nd Lieut. Donald W. Benner, P-1207
2nd Lieut. George R. Acheson, P-1208
2nd Lieut. George H. Macnair, P-1206
2nd Lieut. Richard H. Gilley, P-1198
Captain Robert C. Murphy (Medical Corps), P-1246
Major M. L. Morales (Guatemalian A. C.), P-1245

SPECIAL EVENT NO. 7
Race for Pursuit Type Planes for John L. Mitchell Trophy

(Closed event for pilots of First Pursuit Group)
Distance 120 miles, 12 laps over 10-mile course.
Number of contestants—minimum 4; maximum 20.

Entries

From Selfridge Field:
Major Ralph Royce, P-432
Captain Victor H. Strahm, P-644
Lieut. Julian B. Haddon, P-417
Lieut. Rex K. Stoner, P-222
Lieut. John K. Cannon, P-324
2nd Lieut. Frank D. Klein, P-707
2nd Lieut. Burton M. Hovey, Jr., P-1230
2nd Lieut. Frank G. Irvin, Reserve
2nd Lieut. Frank H. Robinson, P-1228
2nd Lieut. William H. Doolittle, P-1225
2nd Lieut. Ernest H. Lawson, P-1224
2nd Lieut. Robert L. Schoenlein, Reserve
2nd Lieut. John F. Egan, P-861
2nd Lieut. Trevor Kenyon, Reserve

EVENT NO. 1
Relay Race
(Civilians only)

Four teams—five ships to each team—OX5 original type motors only.

Prizes—$1,500. Trophy—B. H. Dyas Company

Winner .....$150 to each pilot on the winning team
Second.....$ 75 to each pilot on the second team
Third.....$ 50 to each pilot on the third team
Fourth.....$ 25 to each pilot on the fourth team

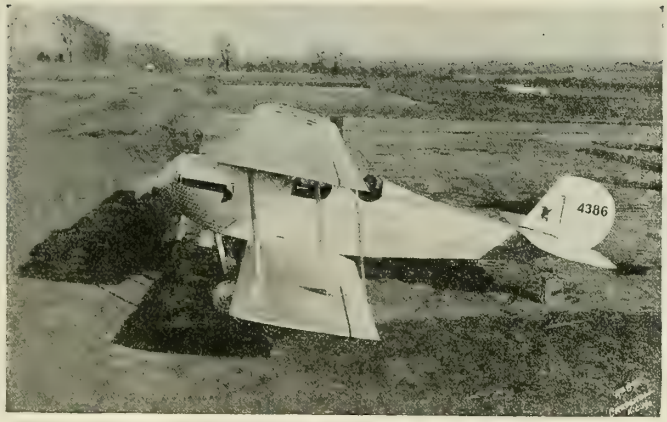
Entries	*Plane*	*Engine*
Gordon K. MacKenzie	Waco-10	Curtiss OX5
Gerbracht Aeron. Corp. Wilford Gerbracht, Pilot	Travel Air	Curtiss OX5
Louis Derryberry	Travel Air	Curtiss OX5

EVENT NO. 2
Free For All
(Civilians only)

Open to all type ships powered with motors of 510 cubic inches displacement or less.

(Continued on next page)

MILESTONES of American Eagle Progress



An increase in production from three planes to more than twenty weekly in six months.

A 100% expansion and development of the Distributor-Dealer Organization.

Six months added to an already splendid record unmarred by structural failure.

A ship long remarkable for performance and safety now offering the beauty of striking color.

And a factory policy designed to keep production abreast of rapidly growing demand.

A splendid display and a number of important announcements are ready for the Aeronautical Exhibition, Los Angeles, Sept. 8-16. Watch the American Eagle at the industry's greatest show.

American Eagle Aircraft Co.

2800 East Thirteenth Street

KANSAS CITY, MISSOURI

OX5, 90 h.p., $2,985; Hisso Model A, $3,500; Ryan-Siemens, 97 h.p., $4,400; Quick, 125 h.p., $4,150; Anzani, 120 h.p., $4,800; Hisso Model E, $3,850; Ryan-Siemens, 125 h.p., $5,825; Salmson, 120 h.p., $5,650.

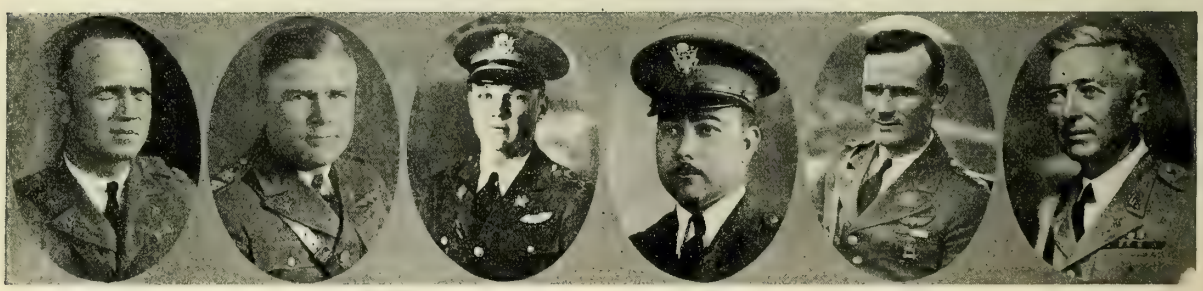
Master of the Skies



Lt. Behncke | Lt. Williams | Lt. Blaufuss | Lt. Davies | Lt. Egan | Lt. Cannon



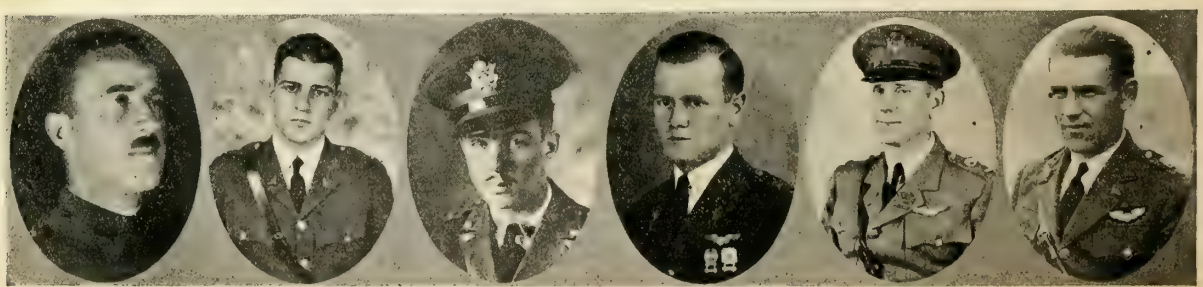
Lt. Briney | Capt. Strahm | Lt. Johnson | Lt. Wolfinbarger | Lt. Gilley | Maj. Morales



Lt. Kennedy | Capt. Sellers | Lt. Lawson | Lt. Fair | Lt. Gross | Capt. Murph



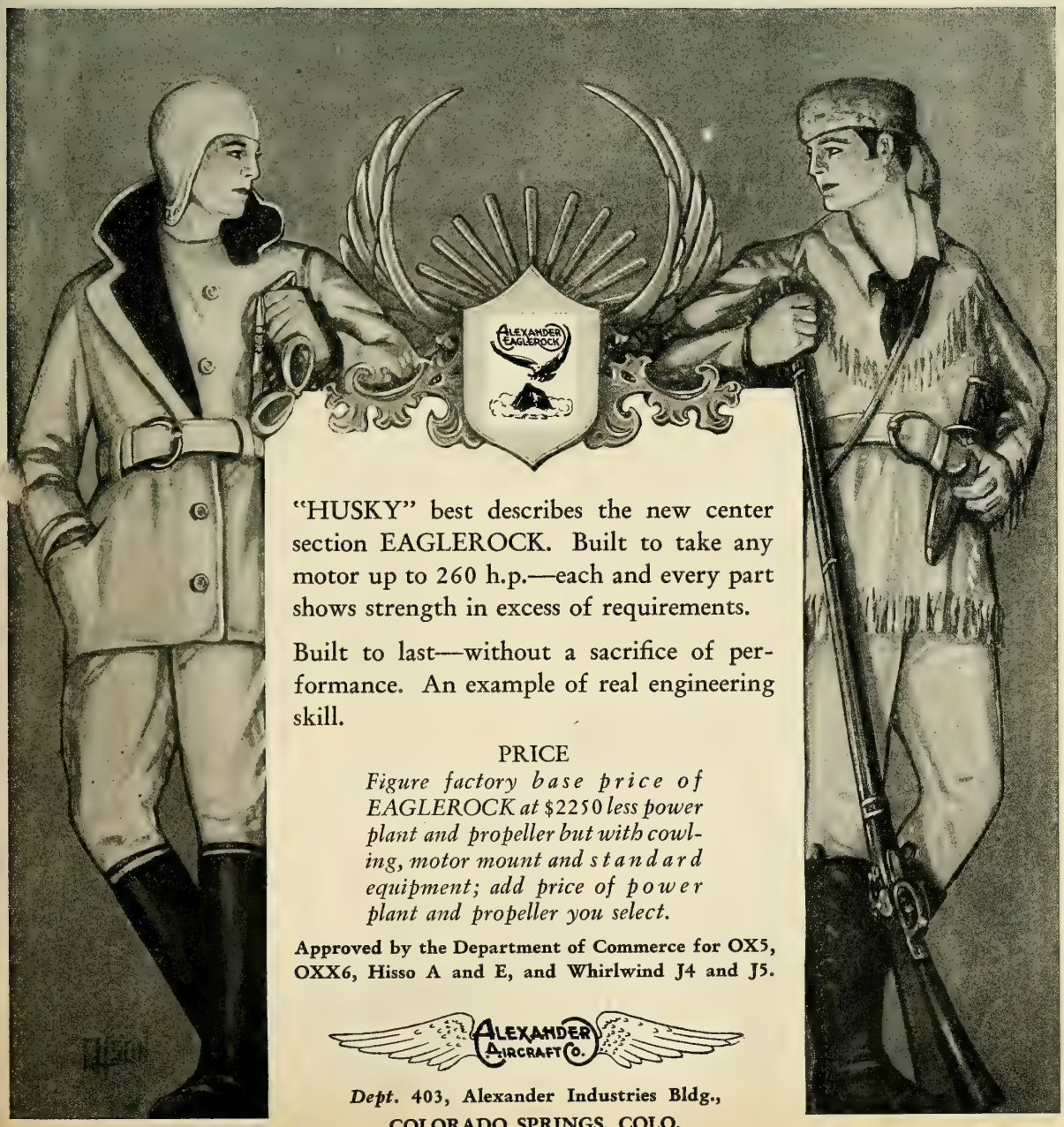
Maj. Royce | Lt. Beaton | Lt. Haddon | Lt. Melville | Lt. George | Lt. Doolittle



Capt. Heisen | Lt. Klein | Lt. Hovey, Jr. | Lt. Malone | Lt. McHenry | Lt. Benner

ARMY PILOTS WHO WILL PARTICIPATE IN THE NATIONAL AIR RACES

The Rugged Construction of the EAGLEROCK is Your Assurance of Safety



"HUSKY" best describes the new center section EAGLEROCK. Built to take any motor up to 260 h.p.—each and every part shows strength in excess of requirements.

Built to last—without a sacrifice of performance. An example of real engineering skill.

PRICE

Figure factory base price of EAGLEROCK at $2250 less power plant and propeller but with cowling, motor mount and standard equipment; add price of power plant and propeller you select.

Approved by the Department of Commerce for OX5, OXX6, Hisso A and E, and Whirlwind J4 and J5.

ALEXANDER AIRCRAFT CO.

***Dept.* 403, Alexander Industries Bldg., COLORADO SPRINGS, COLO.**

Say you saw it in AERO DIGEST

(Continued from preceding page)

Prizes—$2,500. Trophy—West Coast Theatres

Winner	$1,200	Fourth	$200
Second	600	Fifth	100
Third	400		

Entries	*Plane*	*Engine*
Lt. Clinton Burrows	Thunderbird	Curtiss OX5
Curtiss-Robertson Airplane Mfg. Co.	Robin	Curtiss OX5
W. H. Emery, Jr.	Travel Air	Warner
Joseph A. Nowicki	Mohawk Pinto	Warner
Berliner Aircraft Co.	Berliner monoplane	Curtiss OX5
Eugene J. V. Detmer	Travel Air	Curtiss OX5
John Carberry	DeHavilland Moth	Cirrus
Gordon Keith MacKenzie	Waco-10	Curtiss OX5
Mark Falk	Bach	Bristol Lucifer
E. Burrell Smith	Eaglerock	——
Rainbow Aviation Co.	Challenger	Curtiss OX5
Don Phillips	Challenger	——
Louis Derryberry	Travel Air	——
MacMillan Petroleum Products and Martins Airport	Eaglerock	——
International Aircraft Corp.	International F-17	Curtiss OX5
Charles Dycer	Lincoln-Page	——

EVENT NO. 3
Free For All
(Civilians only)

Open to all type ships powered with motors of 720 cubic inches displacement or less.

Prizes—$1,500. Trophy—Western Flying

Winner	$700	Third	$250
Second	400	Fourth	150

Entries	*Plane*	*Engine*
H. S. Myrhes	Simplex	——
D. C. Warren	Travel Air	——

EVENT NO. 4
Free For All
(Civilians only)

Open to all types of open cockpit ships powered with motors of 800 cubic inches displacement or less. All ships to carry total of 340 pounds which includes the weight of the pilot.

Prizes—$3,500. Trophy—A. C. Spark Plug Company

Winner	$1,500	Fourth	$350
Second	800	Fifth	250
Third	500	Sixth	100

Entries	*Plane*	*Engine*
H. C. Lippiatt	Travel Air	Wright Whirlwind
Douglas Company and Ambassador Airways	Douglas	Wright Whirlwind
Northwest Airways	Laird LC-R	Wright Whirlwind
Paul Braniff	Travel Air	Wright Whirlwind
A. E. Cameron	Eaglerock	Wright Whirlwind
E. M. Laird Airplane Co. E. E. Ballough, Pilot	Laird LC-R	Wright Whirlwind

EVENT NO. 5
Free For All Speed and Efficiency Contest
(Civilians only)

Open to all type cabin planes powered with motors of 800 cubic inches displacement or less.

Prize—$4,000. Trophy—Aviation Town and Country Club of Detroit

Speed		*Efficiency*	
First	$750	First	$1,200
Second	450	Second	700
Third	200	Third	400
Fourth	100	Fourth	200

Entries	*Plane*	*Engine*
Texas Company	Lockheed Vega	——
Berry Bros. Thomas Colby Henry B. duPont Victor Dallin, Pilot	Buhl Airsedan Bellanca	—— ——

EVENT NO. 6
Free For All
(Civilians only)

Open to all type cabin planes, either single, bi- or tri-motored ships. All planes to carry a minimum contest load of 1,000 pounds at a minimum speed of 80 miles an hour.

Prizes—$3,000. Trophy—Detroit News Air Transport

Speed		*Efficiency*	
First	$800	First	$800
Second	500	Second	500
Third	200	Third	200

Entries	*Plane*	*Engine*
William Thaw, 2nd Erle P. Halliburton	Lockheed Vega	Pratt & Whitney Hornet
Bob Cantwell, Pilot Harry Tucker	Lockheed Vega	Pratt & Whitney Wasp
Arthur Goebel, Pilot Berry Bros.	Lockheed Vega	Pratt & Whitney Wasp
Thomas Colby Henry duPont	Buhl Airsedan	——
Victor Dallin, Pilot	Bellanca	——

EVENT NO. 7
Parachute Jumping Contest
(Open only to members of the United States Army, Navy or Marine Service)

Prizes—$1,000. Trophy—Russell Parachute Company

Winner	$350	Third	$100
Second	200	Fourth	50

Special prize daily of $100 for the jumper coming closest to the mark on each of the three days of the meet.

Entries

H. L. Whitby, Thomas Crawford, P. O. Morgan, John Hancock, William McRaven, Jr., William Dodson, J. D. Neish, George Harold Brink, Fred Johnston, W. L. Musgrove, Theodore Dworzynski, Steve Walek, Jr., E. C. Lundquist, J. H. Garner, M. H. Weiss.

EVENT NO. 8
(Military only)

Open only to observation two-place type airplanes.

Liberty Engine Builders Trophy

Individual trophy award to first four place winners.

EVENT NO. 9
Navy Pursuit Planes Race
(Military only)

Open to all Navy Pursuit planes of any type.

California Air Race Assn. Trophy

Individual trophy award to first four place winners.

EVENT NO. 10
Army Pursuit Planes Race
(Military only)

Open to any type of Army Pursuit plane.

California Air Race Assn. Trophy

Individual trophy awards to first four place winners.

EVENT No. 11
National Guard Race
(Military only)

Open to any two-place airplanes in the service of the National Guard at any point in the United States.

(Continued on next page)



"We knew from past experience that one of the most important factors of success in our transcontinental flight was faultless lubrication for our Pratt & Whitney 'Wasp' engine"—Art Goebel

COLONEL ART GOEBEL and Harry Tucker established a new transcontinental non-stop record of 18 hours and 58 minutes flying from Los Angeles, California to Curtiss Field, Long Island, New York. Their plane, the "Yankee Doodle," was a Lockheed-Vega equipped with a 410 horsepower Pratt & Whitney "Wasp" engine.

When they planned the flight they knew from past experience that their choice of oil was of paramount importance. The fact that they chose Pennzoil is a recommendation of the highest type.

Pennzoil is 100% Pure Pennsylvania Oil of Supreme Quality. It is sold at a large number of Class A airports. The Manager of your airport can obtain it for you. If not, write directly to

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District Offices and Warehouses in principal cities.

SUPREME PENNSYLVANIA QUALITY

PENNZOIL

REG. U.S. PAT. OFF.

SAFE LUBRICATION

(Continued from preceding page)

Prizes—$1,000. Trophy

Winner	$500	Third	$150
Second	300	Fourth	50

EVENT NO. 12

Free For All Military Pursuit Race

(Military only)

Open to any type plane powered with any motor, in the Army or Navy of the United States or any foreign country.

Trophies: 1st, Aero Digest
2nd, Douglas Company

Individual trophy awards to first four place winners.

EVENT NO. 14

Special Event open to National Guard, Army and Navy Reserve pilots flying PT training type two-place airplanes powered only with 180 h.p. Hispano-Suiza motors.

Prizes—$500. Trophies.

Winner	$250	Third	$75
Second	125	Fourth	50

EVENT NO. 15

Light Airplanes

Speed and Efficiency Contest

(Civilians only)

Open to all type ships powered with motors of 300 cubic inches displacement or less.

Prizes—$3,000. Trophies.

Speed		*Efficiency*	
Winner	$750	Winner	$750
Second	375	Second	375
Third	250	Third	250
Fourth	125	Fourth	125



Air view of the City of Los Angeles

Entries	*Plane*	*Engine*
E. B. Heath	Heath racer	Bristol "Cherub"
Jess Clark and Delmer Wood	Baby Visalia	Lawrance
John Carberry	DeHavilland Moth	Cirrus
Henry B. duPont Victor Dallin, Pilot	Bellanca	——

(Continued on next page)



Watch

HASKELITE

at the Air Races

USUALLY record-breaking planes and more than 85% of all planes on exhibition and competing in important races and reliability tours are HASKELITE-equipped. This was true of the National Air races at Philadelphia two years ago and at Spokane last year. It was true of the three National Reliability Tours. In the tour completed in July, 22 planes of the 25 finishing were HASKELITE - equipped including the prize winning Waco, an exclusive HASKELITE user. At the All-American Aircraft Show in Detroit, the builders who are HASKELITE users exhibited 92.6% of the planes shown.

Not only in record-breaking flights and big public events is HASKELITE prominent. The mail and other commercial planes use it almost exclusively. HASKELITE is found in government planes to the same degree as commercial aircraft. This blood-albumen plywood has never lost its dominant position of leadership in the aircraft field.

Watch HASKELITE

Will it maintain its usual showing of 85%?

Haskelite Manufacturing Corporation

120 South La Salle Street, Room 1120 Chicago, Illinois

CALIFORNIA PANEL & VENEER COMPANY
955 South Alameda Street
Los Angeles, California

RAILWAY & POWER ENGINEERING CORP., LTD
Montreal Toronto Winnipeg
New Glasgow

See Haskelite Manufacturing Corporation in booth 67 at the Los Angeles Aircraft Exposition. California Panel & Veneer Co. in booths 281 and 286.

AD9-Gray



THE PITCAIRN SUPER - MAILWING

Due to the new Air Mail rate of five cents for the first ounce and ten cents for each ounce thereafter, poundage is mounting rapidly. To meet the demand for a high-speed ship capable of carrying the ever-increasing loads, the Super-Mailwing (PA-6), has been designed and is now in production. Six air mail lines have already filed their orders. For early delivery orders should be placed immediately.

The plane has a cargo space of forty cubic feet, nearly twice the capacity of the Mailwing (PA-5), and can accommodate 500 pounds of mail. This has been accomplished by an increase of only twelve inches in the over-all length of the ship. Gasoline capacity has been increased twenty gallons, with a commensurate increase in oil capacity. The plane is fitted with a regular army type adjustable pilot's seat permitting greater visibility for take-off and landing. Other features and refinements include improved fuselage lines, semi-enclosed exhaust manifold, and a new undercarriage design, the whole resulting in performance characteristics comparable with the Mailwing (PA-5). Comparative specifications are as follows:—

	PA-5 Mailwing	*PA-6 Super-Mailwing*
Wing Span . . .	33 ft.	33 ft.
Overall-Length .	21 ft. 10½ in.	22 ft. 10½ in.
Mail Capacity . .	21½ cu. ft.	40 cu. ft.
Gasoline Capacity	56 gal.	76 gal.
Oil Capacity . .	5½ gal.	7½ gal.
Wt. Empty . . .	1742 lbs.	1840 lbs.
Engine	Wright J-5-C	Wright J-5-C

We shall be pleased to submit other specifications and performance data on request

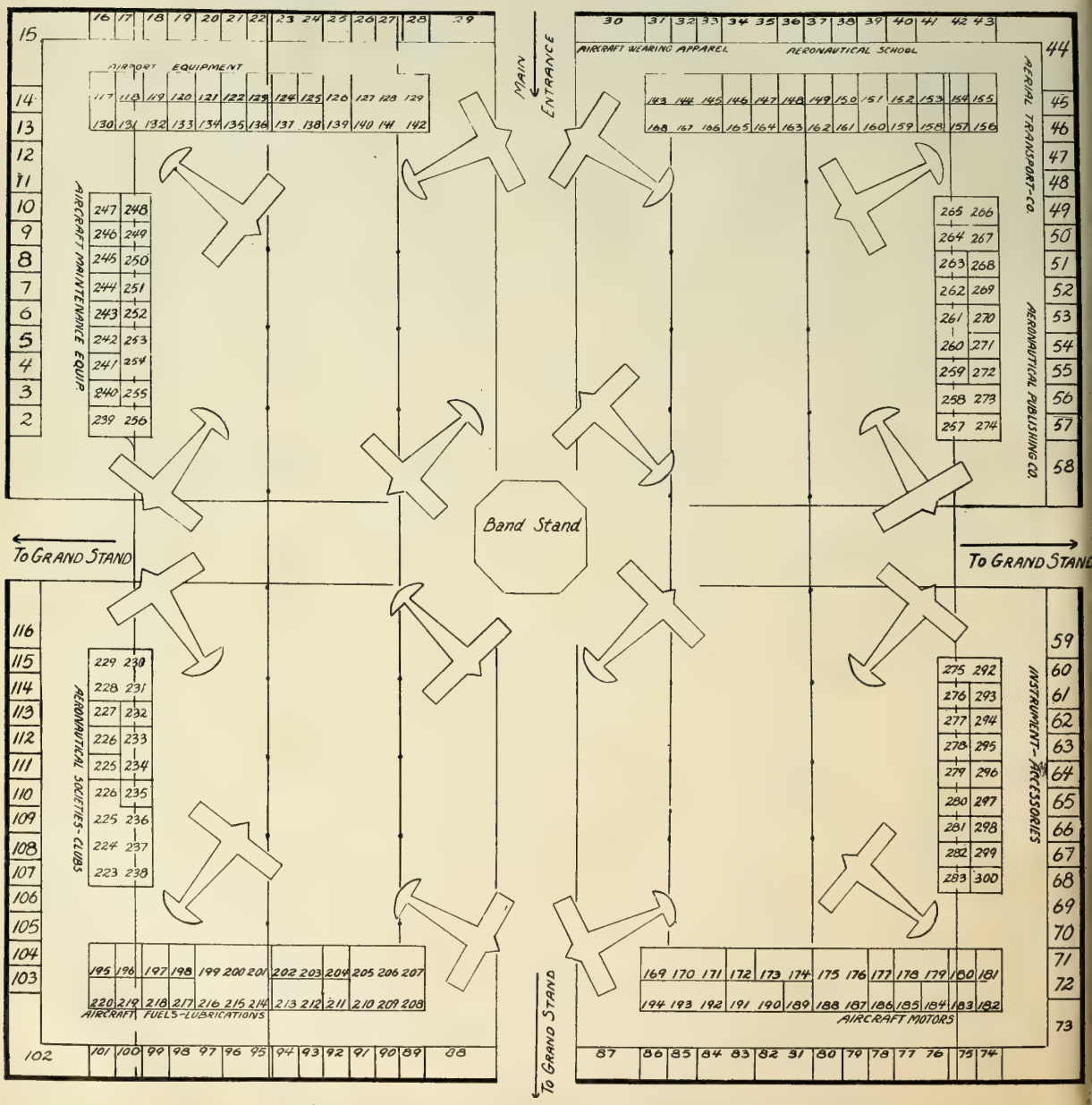
PITCAIRN AIRCRAFT INC.

LAND TITLE BUILDING - - PHILADELPHIA

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Aero Service Company	248-C
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Layout of display space in the exhibition building, Los Angeles Air Show

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Transport Fliers Will Train You

Chief Pilot Meyer (photo below), operator of Meyer Air Transport, supervises all instruction. He was a war time Army Flying Instructor—has taught flying over twelve years, training hundreds of cadets and civilians, with never one injured student. Assistant instructors are long experienced Transport fliers.



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Opportunities abound in Aviation. Factories—Air Transport Companies—Passenger and Express Service—Air Mail—Barnstorming—Aerial Photography—Motion Picture Making—Crop Dusting—are calling for thousands more trained men.

Fascinating

HUNDREDS OF MILLIONS are already being spent in Aviation. BILLIONS more will be spent in the next few years. It is one of the Biggest Pay Industries of today. It is doubtless the most fascinating of uncrowded professions. Find out about it now.

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Every man in Aviation should have thorough Ground training. We train you on real machinery and big equipment in our great seven story shops. Metal construction, wing building, woodworking, engine repair, acetylene and electric welding, carburetors, ignition, complete airplane construction, rebuilding, repairing, are all made easy for you here at Greer College shops.

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Fliers usually work about 4 hours a day—and it's work that's really play. How would a 4 hour day suit you? Clip the coupon. Get my big Free book. Learn how I pay your railroad fare here—how I let you attend Greer College either days or evenings.



Erwin Greer, Pres.

CHICAGO Is the Place to Learn Aviation

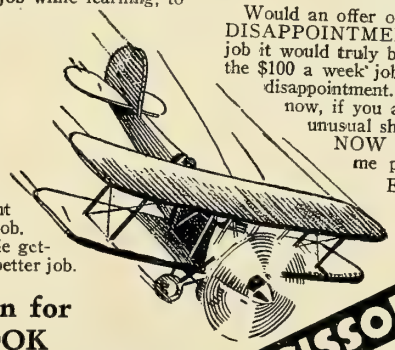
The present Municipal Airport in Chicago is considered the finest of today. The new Chicago Lake Front Airport will be even finer. More than one-third of all Air Mail routes in the United States terminate in Chicago.

I'll Pay Your Fare to Chicago

When you enroll here I'll pay your fare here from any point in the United States. Remember, Chicago is the fastest growing city in the world. Doubtless it will soon be the largest. Chicago is the hub of the Aviation Industry.

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A Job for You – Earn While Learning

Don't let lack of money hold you back. I give you real help to a job while learning. As many as 6 people in my big Employment Department know how to get you a job. You earn your way while getting your training for a better job.

NOW Is the Time

Would an offer of $100 a week be OPPORTUNITY or DISAPPOINTMENT for you? If you could HOLD the job it would truly be OPPORTUNITY. If you can't hold the $100 a week job, PREPARE. Be ready. Don't invite disappointment. Learn about GREER SHOPS. Right now, if you act quickly, I can make you a most unusual short time offer. Clip the coupon NOW and find out. Address me personally.

ERWIN GREER,
President.



J. W. Meyer, Chief Pilot

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Wright Aeronautical Co....169-171
Wynn Tire Company....—
(*AC denotes airplane exhibits*)

EXHIBITORS AT THE AIR SHOW

AIRPLANE MANUFACTURERS

AEROMARINE KLEMM CORPORATION
New York City, New York
Booths A C, 262, 262-A

Several models of the small Klemm light plane; with 20 h.p. and 40 h.p. Mercedes Daimler engines.

ALEXANDER AIRCRAFT COMPANY
Colorado Springs, Colorado

Five Eaglerocks will be exhibited—Model A-1, Wright J-5, 200 h.p.; A-2, Curtiss OX-5, 90 h.p.; A-3, Hisso-A, 150 h.p.; A-4, Hisso-E, 180 h.p.; A-5, Menasco, 260 h.p.

AMERICAN AIRCRAFT CORPORATION
Los Angeles, California
Booths 203-B, 203-C, 211 A-B-C

AMERICAN EAGLE AIRCRAFT CORP.
Kansas City, Missouri
Booth A C

ARKANSAS AIRCRAFT COMPANY
Little Rock, Arkansas
Booth A C

BOEING AIRPLANE COMPANY
Seattle, Washington
Booths 97, 98

The Boeing Airplane Company, together with the Boeing Air Transport, Inc., and the Pacific Air Transport, Inc. will exhibit photographs, data, and several models of Boeing planes, one of which will be the new twelve-passenger transport, Design 80.

They will also have at the field one of the type 40-C mail planes, operated by the Pacific Air Transport, Inc. and one of the twelve-passenger transports soon to be used over the Boeing Air Transport Line.

R. O. BONE
Santa Monica, California
Booth A C

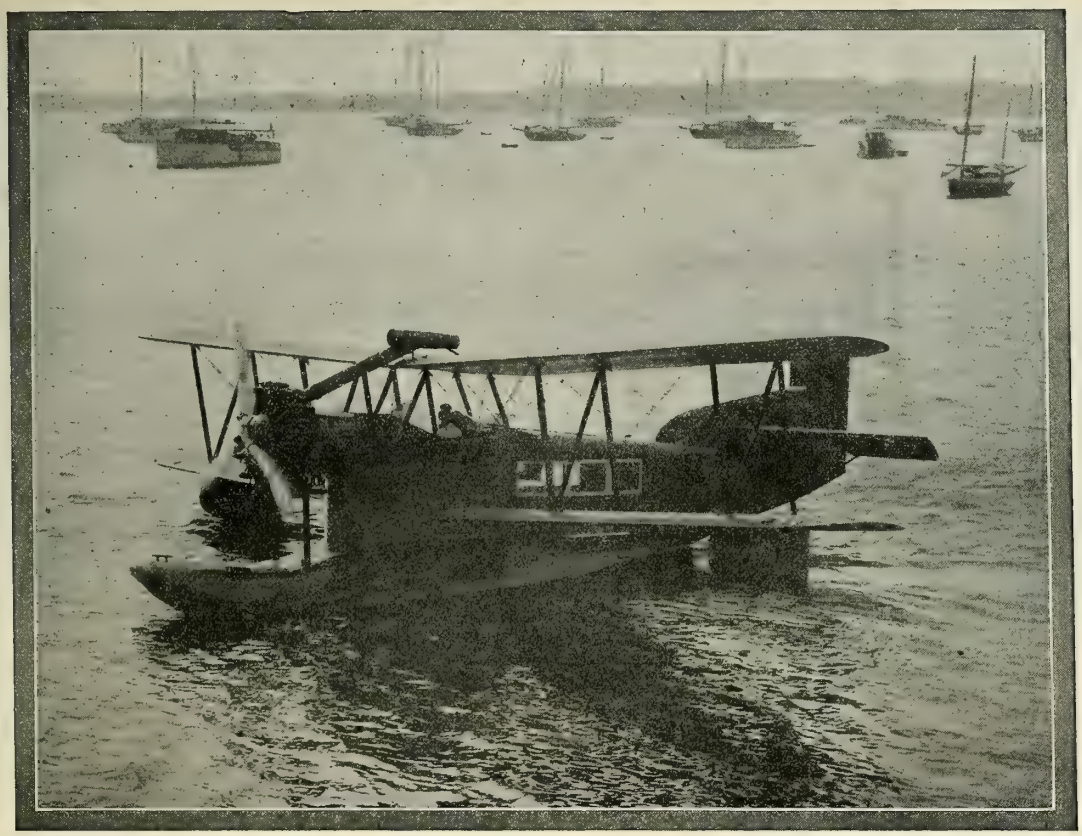
BUHL AIRCRAFT COMPANY
Santa Monica, California
Booth A C

COURIER MONOPLANE COMPANY
Wilmington, California
Booth A C

CURTISS-ROBERTSON AIRPL. MFG. CO.
Anglum, Missouri
Booth A C

The new Curtiss-Robin powered with a Curtiss OX-5 90 h.p. engine will be on dis-

(*Continued on page* 504)



The 119th Loening Amphibian

This machine, equipped with Wright "Cyclone" 500 H.P. air-cooled engine, was recently delivered to Mr. Richard F. Hoyt, Chairman of the Board of Directors of Wright Aeronautical Corporation.

It Does Not Pay To Purchase An Experiment

WHEN you buy a Loening Amphibian, you are purchasing a proven article with over 3,000,000 miles of flying to its credit — not someone's guess of what kind of seaplane his land machine will be with floats, or someone else's guess about how good an amphibian his seaplane will be with wheels.

■■■■■■

From its very inception the Loening Amphibian was designed as an amphibian and for over four years the Loening organization has been specializing on this type of plane, so that during that period this company has constructed more amphibians than all the aircraft manufacturers in the world put together.

■■■■■■

Powered with Pratt & Whitney "Wasp" 425 H.P. air-cooled engine, Wright "Cyclone" 500 H.P. air-cooled engine, or Pratt & Whitney "Hornet" 500 H.P. air-cooled engine.

LOENING AERONAUTICAL ENGINEERING CORPORATION

31st Street and East River **New York City**

...a city of diversified industry...

Buffalo!

INDUSTRIES GROW ON PROFITS ~ *NOT SENTIMENT!*

Seven Sound Reasons Why

Industries Grow and Prosper in the Buffalo District

1. **DIVERSITY FACTOR** 80% of articles listed in U.S. Census of Manufactures are made in Buffalo District Industries.
2. **GEOGRAPHIC LOCATION** At the foot of the Great Lakes—the natural transfer point for lake and rail, air, canal and motor transport.
3. **ECONOMIC ASSEMBLY** Short hauls on raw materials —low freight rates.
4. **HOME-OWNING LABOR** Steady work—continuing wages—low turnover—result in 60% of workers owning their own homes.
5. **CENTER OF BUYING AREA** Within 24 hours of biggest buying population in Canada and United States.
6. **PLENTY OF POWER** At the very door of world's greatest source of power—Niagara.
7. **GATEWAY TO CANADA** 75% of trade between United States and Canada moves through Buffalo - Niagara gateway.

TO prosper most, industries must be located near their buying public, yet convenient to sources of their raw materials.

In the Buffalo District, industries enjoy unsurpassed facilities for the economical assembly of materials, and the profitable distribution of their products.

Situated at the foot of Lake Erie, Buffalo is the common meeting place of land, water and air lines of transportation.

Boats and barges bring in vast cargoes of raw materials at low freight rates.

Fast rail lines, rapid motor trucks, and speeding airplanes effect quick and cheap distribution of finished goods.

Buffalo wants only the factories that belong in Buffalo.

Any industry, having sound economic reasons for locating in this general area, will find it profitable to investigate Buffalo's industrial advantages.

Interested executives are invited to write for "Industrial Analysis of Buffalo and the Niagara Industrial District."

Industrial Department
CHAMBER OF COMMERCE
BUFFALO, N.Y.



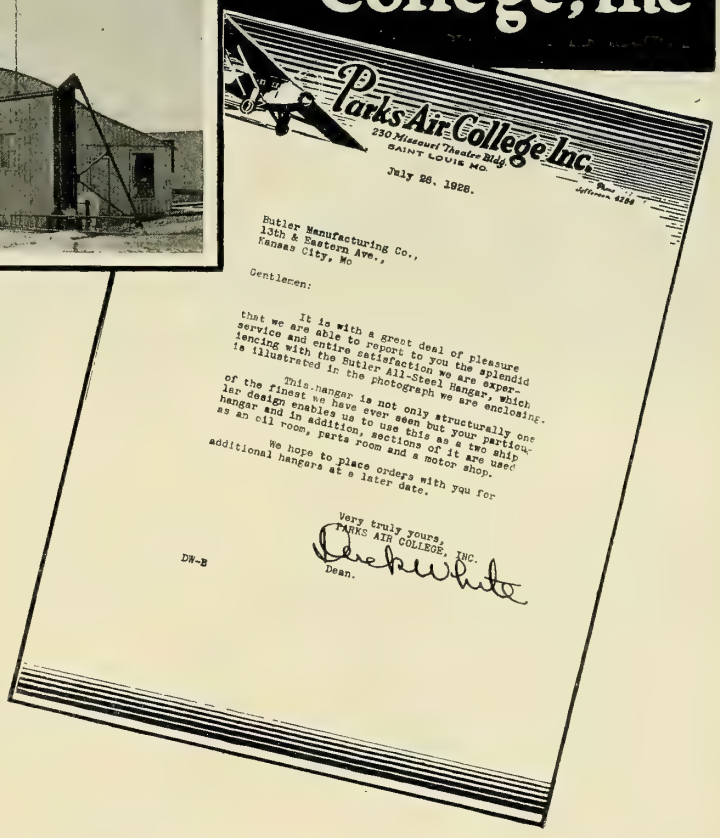
One of a series of advertisements regarding the Industrial advantages of the Buffalo District.

Butler Steel Hangar gives "Entire Satisfaction" says Parks Air College, Inc.





Oliver L. Parks is Vice President of the Parks Air College, Inc., 230 Missouri Theatre Bldg., St. Louis, Mo. This college is said to be the largest and most elaborately equipped civilian air school in the United States.



Parks Air College Inc.
230 Missouri Theatre Bldg
SAINT LOUIS MO.

July 26, 1928.

Butler Manufacturing Co.,
13th & Eastern Ave.,
Kansas City, Mo

Gentlemen:

It is with a great deal of pleasure that we are able to report to you the splendid service and entire satisfaction we are experiencing with the Butler All-Steel Hangar, which is illustrated in the photograph we are enclosing.

This hangar is not only structurally one of the finest we have ever seen but your particular design enables us to use this as a two ship hangar and in addition, sections of it are used as an oil room, parts room and a motor shop.

We hope to place orders with you for additional hangars at a later date.

Very truly yours,
PARKS AIR COLLEGE, INC.
Dean.

DW-B

WHAT the Parks Air College says about Butler Hangars speaks for itself. Please note that this large institution not only stresses the fineness of the structure, but also the flexibility of the use of the building.

Butler Steel Hangars are made for one or many planes. Constructed of 24 gage tight coated galvanized steel, non-combustible, with deeply paneled corrugations. Sheets are bolted together and to the steel frame with galvanized bolts, which provides high salvage value.

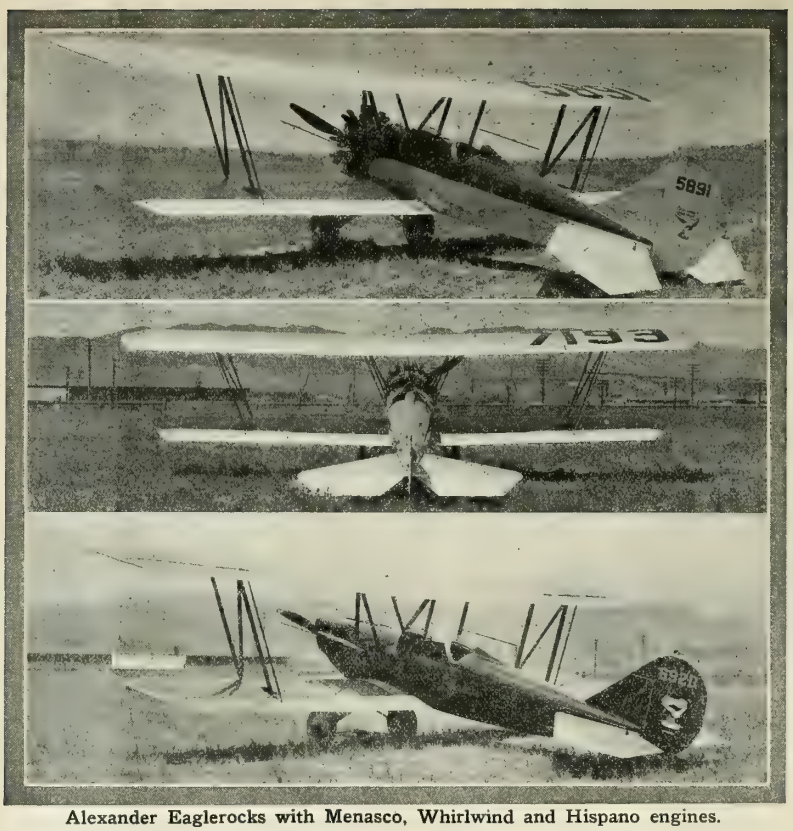
Good lighting arrangement. Easily operated roller bearing equipped doors. Hangars may be enlarged or taken down, moved and re-erected at least expense. Prices f. o. b. plant or erected.

WRITE WITHOUT OBLIGATION FOR COMPLETE LITERATURE.

BUTLER MANUFACTURING COMPANY

KANSAS CITY, MO. BUTLER MINNEAPOLIS, MINN.

Say you saw it in AERO DIGEST



Alexander Eaglerocks with Menasco, Whirlwind and Hispano engines.

(*Continued from page* 500)

play. The "Robin", with a useful load of 700 pounds, has a cruising range of 10 hrs., or 785 miles. It has a landing speed of 40 miles an hour.

DOUGLAS AIRCRAFT CORPORATION
Santa Monica, California
Booth A C

FEDERAL AIRCRAFT CORPORATION
San Bernardino, California
Booth A C

Two of the new three-place enclosed monoplanes. One of these planes will be uncovered and will show the complete structure of an all-steel monoplane. Each ship is equipped with a Hallett seven cylinder, 130 h.p. radial air-cooled engine.

GENERAL AIRCRAFT CORPORATION
Glendale, California
Booth A C

KEYSTONE AIRCRAFT CORPORATION
Bristol, Pennsylvania
Booths 267, 277

Models and photographs will be on exhibition, also motion pictures showing Keystone airplanes in action. It is expected that one of the "Pirate" bombers will be on display in the exhibition hall.

JOSEPH KREUTZER CORPORATION
Los Angeles, California
Booth A C

LOCKHEED AIRCRAFT COMPANY
Los Angeles, California
Booth A C

MOHAWK AIRCRAFT CORPORATION
Minneapolis, Minnesota
Booth A C

MONO AIRCRAFT, INC.
Moline, Illinois
Booths A C, 76, 77

NICHOLAS-BEAZLEY AIRPLANE CO.
Marshall, Missouri

NORTH STAR AIRCRAFT CORPORATION
St. Cloud, Minnesota

PRUDDEN-SAN DIEGO AIRPLANE CO.
San Diego, California
Booth A C

SPARTAN AIRCRAFT COMPANY
Tulsa, Oklahoma
Booth 3-C

The Spartan C-3 three-place open biplane will be on display. Powered with a nine cylinder Walters 120 h.p. motor, it has a cruising speed of 100 miles per hour and a landing speed of 45 miles per hour. With a nine cylinder Siemens-Halske 125 h.p. motor, it has a cruising speed of 95 miles per hour and a landing speed of 45 miles per hour.

STAR AIRCRAFT COMPANY
Bartlesville, Oklahoma
Booth A C

STINSON AIRCRAFT CORPORATION
Northville, Michigan
Booth A C

STOUT METAL AIRPLANE COMPANY
Detroit, Michigan
Booth A C

O. W. TIMM AIRPLANE CORPORATION
Glendale, California
Booth 183

THADEN METAL AIRCRAFT COMPANY
San Francisco, California
Booth A C

THUNDERBIRD AIRCRAFT INC.
Glendale, California

CHANCE VOUGHT CORPORATION
Long Island City, New York
Booth A C

VULCAN AIRCRAFT COMPANY
Portsmouth, Ohio

AIRPLANE PARTS

AERO MODEL COMPANY
Chicago, Illinois
Booth 270

AERO SAFETY APPLIANCE CORP.
Los Angeles, California
Booths 280, 287

ALUMINUM COMPANY OF AMERICA
Pittsburgh, Pennsylvania
Booths 129, 140-B, 141, 142

Many samples of forged strong aluminum

(*Continued on next page*)



The Spartan biplane powered with the 125 h.p. Ryan-Siemens engine.



The Fokker UNIVERSAL

200 h.p. Wright "Whirlwind" Engine
Convertible for Floats and Skis

Double pilots' cockpit; comfortable seats, 4 to 6 passengers; ample separate baggage space. Cabin and cockpit easy of access without disturbing passengers already seated. Sliding glass windows; perfect ventilation and view. Payload (passengers, baggage, mail, freight, etc.) 1,000 lbs. in addition to pilot, oil, 78 gal. gasoline sufficient for 6½ hrs. at cruising speed. High speed, 118 m. p. h.; landing speed, 46 m. p. h. Landing gear, 10 ft. width track, with special shock absorbers for taxiing and landing comfort. Wheel brakes operating individually for ground control, or simultaneously with "parking brake" ratchet. Cockpit-operated hand starter. Highest class accessories and instruments.

Why, among so many "Whirlwind" powered monoplanes, is the Fokker Universal still the leader in the eyes of purchasers with the discrimination which comes from experience?

The Fokker Universal has proved its serviceability and payload carrying capacity on *wheel-gear, skis and floats*. Licensed by the U. S. Department of Commerce *as land plane and seaplane* for 4,000 lbs. total loaded weight. *Fokker veneer-covered wings* and extraordinary soundness of construction in every detail makes possible the intensive commercial operation of the Universal at unexpectedly low cost over a period of years. *Fokker flying qualities* which have made possible the safe transportation of thousands of passengers—many thousands of pounds of freight and mail—through all conditions of weather and climate.

The recent 300% increase in our manufacturing facilities at present enables us to offer quick delivery of the Fokker Universal and Super-Universal types, but owing to the constantly increasing demand, it is advisable to order now to insure spring delivery.

Literature on Request

Fokker Aircraft Corporation of America
Wheeling, West Virginia
New York Office: 110 East 42nd Street
Subsidiary Company: Atlantic Aircraft Corporation
Teterboro Airport, Hasbrouck Heights, N. J.



An airplane camp in Ontario, Western Canada



The Fokker Universal—note the sturdy design of the Fokker landing gear



The Fokker Super Universal—powered with 400 h.p. "Wasp" engine

·· FOKKER AIRCRAFT — SAFEST IN THE WORLD ··

Copyright, 1928, by A. A. C.

(*Continued from preceding page*)
alloy propellers, engine parts, and mould castings will be exhibited. A full size wing stabilizer, rudder, elevator, aileron, etc. will be displayed together with a panel of photomicrographs illustrating the structure and characteristics of Alclad sheet.

CROWN MOTOR CARRIAGE COMPANY
Los Angeles, California
Booth A C

CALIFORNIA PROPELLER COMPANY
Los Angeles, California
Booth 278-B

ENO RUBBER COMPANY
Los Angeles, California
Booth 289

FEATHERLIKE PNEUMATIC PRODS. CO.
Los Angeles, California
Booth 7

JAY MANUFACTURING COMPANY
Los Angeles, California
Booth 285

JACUZZI BROTHERS
Berkeley, California
Booth 291

MACWHYTE COMPANY
Kenosha, Wisconsin
Booth 278

J. A. MEYERS
Los Angeles, California
Booth 161-A

JOHN A. ROEBLING'S SON'S COMPANY
Los Angeles, California
Booth 63

NATIONAL STEEL PRODUCTS CO.
Dayton, Ohio
Booth 101

PARKER APPLIANCE COMPANY
Cleveland, Ohio
Booth 65

RUSSELL MANUFACTURING COMPANY
New York City, New York
Booths 71, 72

STEWART HARTSHORN COMPANY
New York City, New York
Booth 6

STANDARD STEEL PROPELLER CO.
Homestead, Pennsylvania
Booths 60, 61

CHARLES S. STOREY
Glendale, California
Booth 278-D

E. S. TWINING AND COMPANY
Los Angeles, California
Booth 172

AIRPORTS

THE L. A. METROPOLITAN AIRPORT CO.
Los Angeles, California
Booth 259

A complete scale model of an airport, showing plans for the completion of the development, will be exhibited.

PORT OF OAKLAND
Oakland, California
Booth 22

ROGERS AIRPORT
Los Angeles, California
Booth A C

VIRGINIA BRIDGE AND IRON COMPANY
Los Angeles, California
Booth 140

CLOTHING AND EQUIPMENT

BROUNSTEIN LEWIS COMPANY
Los Angeles, California
Booth 32

D. BUEGELEISEN
Los Angeles, California
Booths 34, 35

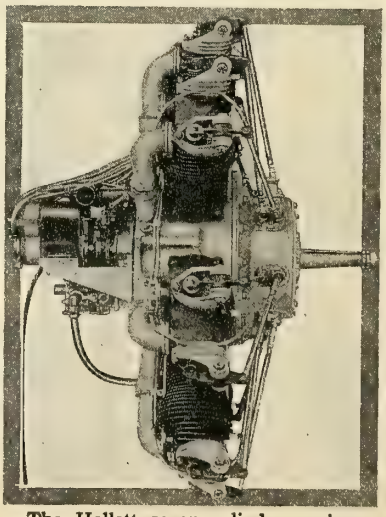
COHN GOLDWATER MFG. COMPANY
Los Angeles, California
Booths 16, 18

DESMONDS
Los Angeles, California
Booths 143, 144, 145

GORDON & FERGUSON
St. Paul, Minnesota
Booths 166, 167, 168

FAMOUS DEPARTMENT STORE
Los Angeles, California
Booths 151, 160

HARRIS & FRANK
Los Angeles, California
Booth 162



The Hallett seven cylinder engine.

MARSHUTZ OPTICAL COMPANY
Los Angeles, California
Booth 165

E. B. MEYROWITZ, INC.
New York City, New York
Booth 263

PUGET SOUND GLOVE CO.
San Diego, California
Booths 34, 35

A. G. SPAULDING & BROS.
New York City, New York
Booths 41, 42, 43

SCULLY BROTHERS
Los Angeles, California
Booth 31

ENGINES

ANZANI MOTOR COMPANY
Los Angeles, California
Booth 181, 182

AXELSON MACHINE COMPANY
Los Angeles, California
Booth 189-A

CURTISS AEROPLANE & MOTOR CO., INC.
Garden City, New York
Booths 174-A, 174-B

In contrast to its complete line of modern engines, the famous old Curtiss motorcycle with which Glenn Curtiss in 1907 traveled a mile at the record breaking speed of 137 miles an hour, will be exhibited. The Curtiss "Challenger" will make its debut (this engine is illustrated and described in detail in the Technical Section of this issue) and the "Chieftain" will be shown for the first time in Los Angeles. The "Conqueror" and D-12 models also will be shown, as will the Curtiss-Reed duralumin propeller.

FAIRCHILD CAMINEZ ENGINE CORP.
Los Angeles, California
Booth 203-B

HALLETT MANUFACTURING COMPANY
Los Angeles, California
Booths 173, 174

Two seven-cylinder radial air-cooled engines will be on display.

KINNER AIRPLANE & MOTOR CORP.
Glendale, California
Booths 175, 176, 187 188

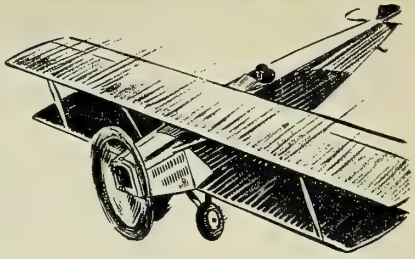
The Kinner Corporation will have an engine display covering four display spaces with officials in charge at all times. Kinner motored planes will be on the field for demonstration purposes.

MENASCO MOTORS COMPANY
Los Angeles, California
Booth 189-C

THE PRATT & WHITNEY AIRCRAFT CO.
Hartford, Connecticut
Booths 178, 179

One series B "Wasp" engine and one geared "Hornet" will be featured. These engines
(*Continued on next page*)

Aviators *now trained a Newer, Easier, Cheaper Way*



The College of the Air Introduces a Method of Training Found After Four Years of Teaching Experience



Now Everyone Can Learn to Fly!



FOR four years Marshall students have graduated from our courses to find profitable, responsible positions as pilots, aircraft mechanics, designers, airport managers, and traffic managers. The reputation of this school has been built upon the fact that every student has received the training that will fit him to enter into aeronautical work. The rigid training and specialized equipment that have been provided for them have assured their success. Now everything is available to carry on the same high standards of the past.

But after these four years of specialization in the better methods of teaching young men to fly, the pilots have found a new system of teaching. The whole process of instruction is far different from, and better than, any now known. Instruction will be cheaper, too. Now, with this new method anyone can take as much training as he really wants and can afford. No longer need those lacking the large sums, usually required for training, pass by the great experience of flying.

The straight flying course at $75.00 is within the reach of everyone. Anyone who is physically fit can take this course and learn the art of straight flying and straight landings and take-offs. The wide range of courses enables you to choose your instruction as you advance through school. The brilliant, apt student under this new plan will receive instruction far cheaper than in the past. Students will pay for what they take—no one will be forced to pay a large sum for a useless amount of training.

The special fall term opens on September 15th—just a few days away. That is the best time to start your instruction—the air in the early morning and late evening is crisp and snappy—your motor pulls like a demon and your ship responds to your slightest touch. Plan to enter with the many other students.

Mail the coupon below and get the full information on our special low rates and our new method of instruction together with our catalog. Mail it today!

YOU REALLY HAVE A CHOICE IN THIS GROUP OF COURSES

1. Straight Flying Course—regular flying instruction including turning, banking, climbing, diving, landings, and take-offs. All the fundamentals and requisites of ordinary flying are taught—a good course to determine your ability as a flyer. Price—$75.00.

2. Intermediate Flying Course—includes all of the work of the straight flying course and advances the student into cross wind landings and take-offs and the difficulties encountered in flying in all sorts of conditions. Gives more experience in all types of flying. Nearly every angle of flying is taught in this course. Price—$150.00.

3. Ten Hour Flying Course—includes all instruction that is given in both straight flying and intermediate courses. Full ten hours of work in the air is offered with all types of instruction. Price—$200.00.

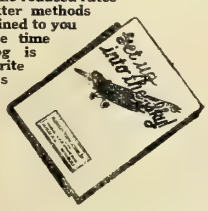
4. Complete Flying Course—all the principles of flying and every needed requisite to make you a successful flyer is given. Forced landings, cross country and all-weather flying. You are taught to have confidence in your own ability. You are guaranteed solo flying. No bond required. Price—$245.00.

5. Private Pilot's License Course—includes all the flying time and training for a private pilot's license. Our training completely qualifies you for eligibility for your license. Ten hours of solo flight. We arrange for your examination at our field. No bond required. Price—$150.00 after solo.

6. Limited Commercial Course—this special advanced course qualifies you under the Department of Commerce for the Government Limited Commercial Pilot's License. Sixty hours' training for $700.

7. Mechanics and Engineers Ground Course—includes metal airplane construction, repair and maintenance, motor assembly and overhaul; steel fuselage construction and repair; aerial mapping meteorology, navigation, instrument reading and theory of flight assembly. Undoubtedly the finest ground course in the country. Plenty of equipment. 300 hours of training. Price—$75.00. Free with all courses except straight flying course.

Write for this modern flying school catalog. It tells you all about the work of this great flying school—with pictures of how planes are made, covered and set up. Every detail of instruction is vividly explained.
A special offer is open to you now, too. The reduced rates and the better methods will be explained to you at the same time the catalog is mailed. Write for yours today!



MARSHALL FLYING SCHOOL, INC.

650 North English Street *Marshall, Mo.*

MAIL THIS COUPON

Marshall Flying School, Inc.,
650 North English St.,
Marshall, Mo.

Please mail me your catalog together with full information on your new method of training aviators and the particulars of your special offer.
I have checked the particular training I am interested in and expect to work to that end.

NAME .....

ADDRESS .....

☐ Pilot
☐ Mechanic
☐ Designer
☐ Aircraft Business

(*Continued from preceding page*)
have the regular commercial ratings, i. e. 400 h.p. for the "Wasp" at 1900 r.p.m. and 500 h.p. for the "Hornet" at 1900 r.p.m. The reduction gearing on the "Hornet" is two to one.

In addition to these engines, there will be photographs showing military and commercial installations, along with the record-breaking Vought "Corsair", Navy "Apache" and the PN-12.

ROCKY MOUNTAIN STEEL PRODS., INC.
San Diego, California
Booths 83, 84

Their new nine-cylinder air-cooled radial motor will be exhibited.

RYAN AERONAUTICAL COMPANY
San Diego, California
Booth 151

O. E. SZEKELY CORPORATION
Holland, Michigan
Booths A C, 190, 191

WRIGHT AERONAUTICAL CORP.
Paterson, New Jersey
Booths 169, 170, 171

A dummy "Whirlwind" engine, a dummy "Cyclone" and a sectioned "Whirlwind" engine which will be operated by electric motor to show the disposition and movement of the parts will make an interesting exhibit.

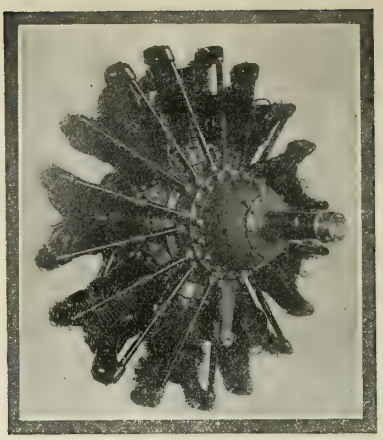
WARNER AIRCRAFT CORPORATION
Detroit, Michigan
Booth 189

ENGINE PARTS

AHLBERT BEARING COMPANY
Los Angeles, California
Booths 278-C, 288-B

ALUMINUM ALLOY CASTING COMPANY
Los Angeles, California
Booth 75

ATLAS MACHINE WORKS
Los Angeles, California
Booth 180



Geared type Pratt & Whitney "Hornet"

BOHN ALUMINUM AND BRASS CORP.
Detroit, Michigan
Booths 203-A, 211-C

ROBERT BOSCH MAGNETO COMPANY
Long Island City, New York
Booth 282

CHAMPION MACHINE & FORGING CO.
Cleveland, Ohio
Booth 93

CHAMPION SPARK PLUG COMPANY
Cleveland, Ohio
Booths 283, 284

COOPER HEWETT ELECTRIC COMPANY
Hoboken, New Jersey
Booth 134

EX-CELL-O TOOL & MFG. COMPANY
Detroit, Michigan
Booth 185

Precision aircraft motor parts and their standard line of internal grinder spindles, drill bushings, etc. will be on view. Mr. William F. Wise will be in attendance.

SCINTILLA MAGNETO COMPANY
Sidney, New York
Booth 192

THADEN METAL PRODUCTS COMPANY
San Francisco, California
Booth A C

THE TIMKEN ROLLER BEARING CO.
Canton, Ohio
Booths 279, 288

The outstanding features of this exhibit will be a Hallett seven-cylinder radial motor, and a Ford landing wheel, both equipped with Timken bearings. The engine, which has a total of thirty bearings, two on the crankshaft, and the rest on the rocker arms, will be cut away in sections to show the location and method of mounting the bearings. The company will be represented by Mr. W. J. Chievitz; Mr. R. W. Kerr; Mr. G. C. McMullen; and Mr. R. C. Cross

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TSUNGANI PISTON COMPANY
Tacoma, Washington
Booth 86

VELLUMOID COMPANY
Worcester, Massachusetts
Booth 21

ENGINEERS

AIRPORT ENGINEERING COMPANY
Los Angeles, California
Booth 124

WILLIAM WATERHOUSE
Hollywood, California
Booth 268

FINANCIAL

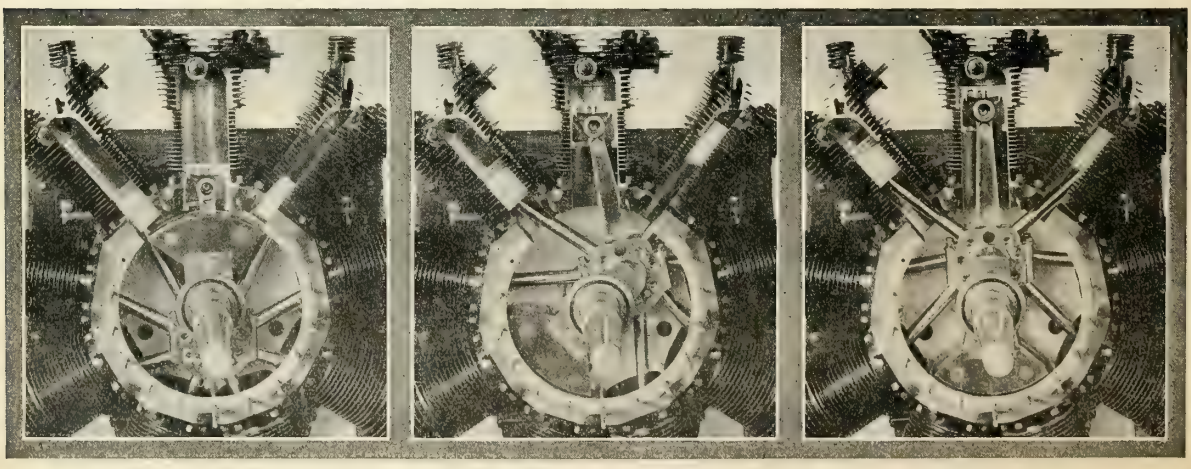
PACIFIC FINANCE CORPORATION
Los Angeles, California
Booth 262-B

FIRE EXTINGUISHERS

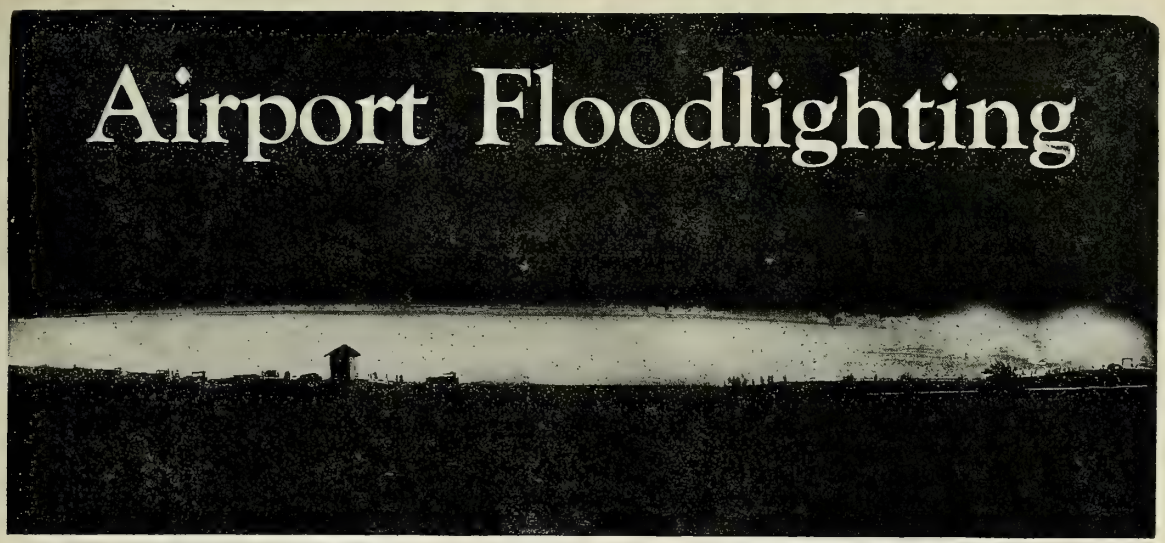
PYRENE MANUFACTURING COMPANY
Los Angeles, California
Booth 278-A

PHISTER MANUFACTURING COMPANY
Los Angeles, California
Booth 136

(*Continued on page* 512)



Wright Whirlwind demonstration engine cut away to show the operation of its moving parts.



Hadley Field, New Brunswick, N. J., illuminated by B. B. T. Air-Mail Type Landing Floodlight

Area of Illumination

Airport floodlighting can only be considered adequate when the entire field is covered with an evenly distributed intensity of illumination.

The B. B. T. Air Mail Type Landing Floodlight not only covers the airport but clearly defines the surrounding territory. All obstacles adjacent to the airport are made visible. A newspaper can be read three miles away.

The "daylight at night" intensity produced only by this floodlight unit is free from scallops, dark angles and areas more brilliantly illuminated than others. Confusion as to the character of the landing area is avoided.

This B. B. T. Landing Floodlight is the eventual requirement for every airport used for night landings. The most efficient is in the end the most economical. Every airport lighting requirement is provided by B. B. T. Consult the pioneers in aviation lighting.

Catalog gladly forwarded on request.

B. B. T. CORPORATION OF AMERICA

ATLANTIC BUILDING PHILADELPHIA PENNA.

Say you saw it in AERO DIGEST

The Plan and Purpose of Aeronautical Industries, Inc.

AERONAUTICAL INDUSTRIES, INC., has been formed to provide the American public with an opportunity of making a cross section investment in the aeronautical industry.

A group of technical and financial experts are investing the fund in various domestic and foreign companies engaged in the different branches of the industry, including the manufacture of airplanes, engines, instruments, and accessories, passenger, mail, and express transportation, the development of airports, and such other phases of the aeronautical industry as may, from time to time, demonstrate their feasibility.

OFFICERS AND DIRECTORS

Lester D. Gardner, former publisher of Aviation, is president. The Board of Directors includes the following: C. Everett Bacon, partner Spencer Trask & Co.; Samuel S. Bradley, General Manager Aeronautical Chamber of Commerce of America; Benjamin F. Castle, General Manager First Federal Foreign Investment Trust; Capt. Charles E. Courtney, U. S. N., supervisor of New York Harbor, formerly President Bergen Paper Co.; Alexander Klemin, Professor of Aeronautics at N. Y. University; Gerald M. Lauck, partner of N. W. Ayer & Son; Alexander J. Lindsay, president American Phenix Corp., attorney for the bankers; Louis F. Reed, Reed and Bassford, attorney for the Corporation; Louis W. Stotesbury, attorney; W. W. Sutton, Jr., Vice-President W. W. Townsend & Co., Inc.; William W. Townsend, President W. W. Townsend & Co., Inc.

AERONAUTICAL INVESTMENT

To secure banking support, certain financial elements are necessary. Primarily, a record of earnings over a period of years is a fundamental requisite. This requirement was impossible to meet by many airplane companies, and expansion programs had to be financed privately. But the public took matters into its own hands and without the usual formality of having securities vouched for by bankers, commenced a speculative investment campaign that has been one of the outstanding phenomena in recent financial experiences. New offerings of aeronautical stocks are being made almost daily and unless some stabilizing influence is brought to bear, there is danger of history repeating itself and the optimism of thousands of investors being subjected to unnecessary losses.

IMPARTIAL EXPERT MANAGEMENT

To secure the maximum of benefit from the "group investment" plan, experienced direction is required. The aeronautical field is so broad that a specialist in one branch may be entirely uninformed of the possibilities in other directions. A board of managers of an investment fund must consider every possible investment field in the aeronautical industry based on judgment acquired from long personal contact with aviation development. A statistical organization must be created to secure every available fact which may have any bearing on the trend of aerial progress. Not only must the analysis of the record of each individual company be made but the market for aeronautical equipment must be constantly investigated. The flow and direction of orders must be followed. The ability of individuals engaged in the industry should be constantly under the closest scrutiny. This plan is only possible when investors act together. The expense of securing such expert opinion, preparing engineering reports, and maintaining a continuous statistical contact with the entire field is too great for any individual. Only by a pooling of interest can the largest use be made of these advantages.

Equally important is the necessity for impartial judgment. It has been the aim of Aeronautical Industries, Inc., to secure as officers and directors men who, though experienced in aeronautics, finance, and industry, have no affiliations that would tend to warp their judgment.

THE ADVANTAGES OF DIVERSIFICATION

To secure the greatest return on investments as well as to secure the greatest safety, a spreading over the whole field is advantageous. Individuals would find this difficult, if not impossible. Only when sufficient amounts of capital to warrant thorough investigation are available, can this spread of diversification be secured.

The opportunities for investment are often much more favorable in smaller companies than in those whose securities are known to the public. The requirements are smaller and they are willing, when in need of funds for expansion, for a single investor to secure all the reward. Such companies do not make their financial operations public and, therefore it is only through investigation that such opportunities can be found.

Aeronautical Industries, Inc., proposes to furnish the pioneer investment fund of the expansion of aviation, to provide the most expert direction that it is possible to secure, to explore the field of aeronautical investment, to maintain contact with the growth of the aeronautical industry, and through diversification secure for its stockholders the maximum of safety and possibility of profits.

Any information regarding the corporation's activities will be furnished on request.

AERONAUTICAL INDUSTRIES, INC.

Lester D. Gardner, President

292 MADISON AVENUE NEW YORK CITY

If you're a Man of Action Read Every Word on this Page



Walter Hinton

Pilot of the NC-4—*first* plane to cross the Atlantic. *First* to fly from North to South America—and *first* to explore the jungles of the Upper Amazon. During the War he was an expert Navy flight instructor. Today he is training ambitious men for Aviation. He can help YOU!

TWO YEARS from now you will be *two years too late* to capitalize the opportunity that is YOURS TODAY in *Aviation!* Not that you wouldn't be able to break into the field then. But you'd be handicapped and outdistanced by the wiser ones who started when the time was ripe.

Don't make the mistake of thinking that the big boom in Commercial Aviation is five or ten years off. It's here NOW! —TODAY there is tremendous growth, tremendous profits in the Air. A vast network of mail, express and passenger service blankets the country; and it's getting bigger all the time. Almost every month more millions are being invested in planes, plants, airports, airways.

The right start, rapid progress and the Biggest Success depend on getting into Aviation NOW! This is no time for doubting or hesitation. Thousands of good jobs—*big-pay* jobs—are open in over 40 fascinating branches of work both in the air and on the ground. They will be filled as fast as men can be trained for them. The man who ACTS TODAY is the man who two years from now will thank his lucky stars that he KNEW enough to *start SOON enough!* You can be that man!

I Will Train You Right at Home for the Job You Want at the Pay You Want

In every part of the country, my students are stepping into jobs that *pay*. The training I give them—and am ready to give YOU—covers the fundamental facts; a real working knowledge of motors, plane design and construction, rigging, instruments, repairs, theory of flight—Aviation, the Airplane and the Airport.

Understand, you take this training *right at home*. My course is backed up by over 12 years in Aviation and over 400,000 miles of flight. It is endorsed by some of the biggest men and biggest corporations in the field today. It trains you thoroughly, gives you a foundation for a real start, real progress and a real future in the livest, fastest growing industry the world has ever seen!

The book shown below talks facts. It shows you exactly *where* you can fit into Aviation—*how* I train you and how to get *started*. It is FREE to men who are ready to take a hand in the development—a share in the profits—of this great, twentieth century industry of the Air. Wake up to the opportunity that is yours TODAY! Recognize in the coupon below a right-at-hand means to find out where YOUR future lies! Mail it NOW!



Rush back to Washington *Quick*

Walter Hinton, Pres., 102-J
Aviation Institute of U. S. A.,
1115 Conn. Ave., Washington, D. C.

Dear Lieut. Hinton: I want to know how you can train me right at home for a real place in Aviation. Rush me your FREE book.

Name .....

Street ..... *Age* .....

City ..... *State* .....

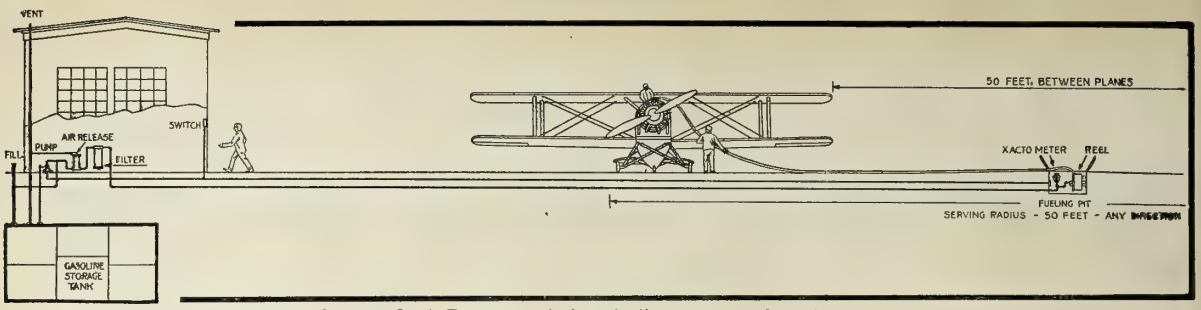


Diagram showing the standard Bowser aviation fueling system for airports and landing fields.

(*Continued from page* 508)

FUELING SYSTEMS

S. F. BOWSER & COMPANY, INC.
San Francisco, California
BOOTH 140

A fueling system which is operated from a pit set flush with the field eliminating ground hazard will be demonstrated. Planes can be fueled within a radius of fifty feet in all directions. A fueling system on the field has been supplied gratis for the convenience of the racing planes.

GASOLINE AND OIL

The following companies will be ably represented at their respective booths:

ASSOCIATED OIL COMPANY
San Francisco, California
BOOTHS 199, 200, 201, 215, 216

KENDALL REFINING COMPANY
Bradford, Pennsylvania
BOOTH 202, 203

THE NATURALINE CO. OF AMERICA
Tulsa, Oklahoma
BOOTH 99

PHILLIPS PETROLEUM COMPANY
Bartlesville, Oklahoma

RICHFIELD OIL COMPANY
Los Angeles, California
BOOTHS 205, 206, 207, 208, 209, 210

STANDARD OIL CO. OF CALIFORNIA
Los Angeles, California
BOOTHS 228, 229, 230, 231

STANDARD OIL COMPANY OF INDIANA
Chicago, Illinois
BOOTHS 233, 234

SHELL OIL COMPANY
Los Angeles, California

TEXAS PACIFIC COAL & OIL COMPANY
Fort Worth, Texas
BOOTHS 212, 213

UNION OIL COMPANY OF CALIFORNIA
Los Angeles, California
BOOTHS 221, 222, 223, 236, 237, 238

WESTERN OIL CO.
Los Angeles, California
BOOTHS 225, 226

HANGARS

BUTLER MANUFACTURING COMPANY
Kansas City, Missouri

A small model of a steel hangar showing construction in detail will be displayed. A miniature plane will be in the model. The company will be represented by the Airport Engineer Service Company of Los Angeles.

GUARANTEED AIRCRAFT HANGAR CO.
Richmond Hill, New York

A hangar, 40 feet by 40 feet, spacious enough to accommodate two airplanes, will be erected at the exhibition. One of the features of these hangars is a patented interlocking device which overcomes the possibility of a leaking roof. Skilled labor is not required to erect or take down these hangars.

INSTRUMENTS

CONSOLIDATED INSTRUMENT COMPANY OF AMERICA
New York City, New York
BOOTHS 275, 292

A complete line of aircraft instruments will be displayed, an interesting feature of which will be an indirect lighted panel. Mr. F. K. Gundlach and Mr. M. E. Hulse will represent the company.

PIONEER INSTRUMENT COMPANY
Los Angeles, California
BOOTHS 68, 69, 70

INSURANCE

TRANSPORTATION INDEMNITY CO.
New York City, New York
BOOTH 273-B

BEHRENDT-LEVY, INC.
Los Angeles, California
BOOTHS 265, 266

LIGHTING EQUIPMENT

CROUSE HINDS COMPANY
Los Angeles, California
BOOTHS 131, 132

GENERAL ELECTRIC COMPANY
Los Angeles, California
BOOTHS 137, 138

PINEAU ELECTRIC COMPANY
Los Angeles, California
BOOTH 255

Ornamental lighting for booth displays.

WESTINGHOUSE ELECTRIC & MFG. CO.
East Pittsburgh, Pennsylvania
BOOTHS 89, 90

Lighting units which make up the complete illumination system of an airport and several sizes of Micarta propellers, control-wire pulleys and fair leads will be exhibited. The Westinghouse Company will completely light Mines Field.

PARACHUTES

FOLLMER CLOGG COMPANY
Lancaster, Pennsylvania
BOOTH 62

IRVING AIR CHUTE COMPANY
Westwood, California
BOOTH 59

RUSSELL PARACHUTE COMPANY
San Diego, California
BOOTH 203-B

A complete line of Russell "Lobe" parachutes, including the new 50, 60, and 70 foot parachute for lowering an entire plane and passengers will be exhibited, also a simplified landing flare and a new line of Russell "Speed Cap" helmets.

PLYWOOD, TUBING, ETC.

CALIFORNIA PANEL & VENEER CO.
Los Angeles, California
BOOTHS 281, 286

Exhibits of Haskelite plywood, chrome molybdenum tubing, cement coated nails, and SAE 1025 cold rolled strip steel. Most of these materials will be shown as parts of an airplane.

HASKELITE MANUFACTURING CO.
Chicago, Illinois
BOOTH 67

Haskelite blood glue plywood and samples of airplane parts built by leading manufacturers will be shown. Mr James R. Fitzpatrick, vice president and secretary, and Mr. C. E. Scott, sales engineer, will represent the company.

SCHOOLS

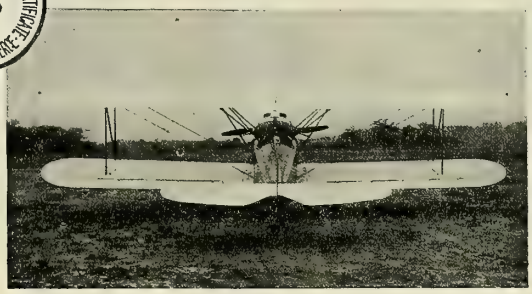
MONROVIA AIR CLUB
Monrovia, California
BOOTHS 126, 139

(*Continued on page* 516)



A Better Ship!

MANUFACTURED UNDER APPROVED TYPE CERTIFICATE-DEPT. OF COMMERCE-No 53



The Command-Aire

Factory Running 50 Per Cent Overtime to Supply Demand for the Command-Aire!

Nothing could more simply and completely tell the story of Command-Aire Success.

Advanced Design
Rugged Construction
Beautiful Appearance
Outstanding Performance

DEALERS from all parts of the country are recognizing the Command-Aire as a good will builder, easier to sell and offering one of the most attractive and profitable franchises in the industry. Your territory may still be open.

Price $2,450 complete, less motor and propeller, at Little Rock. $3,250 at Little Rock, complete with Curtiss OX5 motor.

Descriptive folder and details of dealer franchise upon request.

Arkansas Aircraft Corporation
Little Rock, Arkansas

Aeronautic activity more intense every day yet the public is still only "air-interested"

The Air mail rate is reduced to 5c. More air mail routes are established. New passenger lines are inaugurated. Air and rail routes are planned. Ship to shore by air is being tried. Air ports are being built. Flying schools are springing up like mushrooms. New engines are being developed. Cheaper planes are being manufactured.

Still, the public is only "air-interested."

We are not pessimistic about the aircraft industry. If anything we are over-optimistic. We see all this aeronautic activity becoming more intensified every day. But we would like to see the public becoming more "air-minded" in the same degree.

Controlled education and promotion is necessary. What Ford is doing is splendid but besides, something is now needed more specific, more practical. This is a matter of concern for the entire industry, not just Ford or Fairchild or any other one manufacturer.

We have been discussing this subject in these pages for months. We have received most encouraging commendation but we are anxious now to see action. Perhaps Major Gardner directing the expanding activities of the Aeronautical Chamber of Commerce will cooperate.

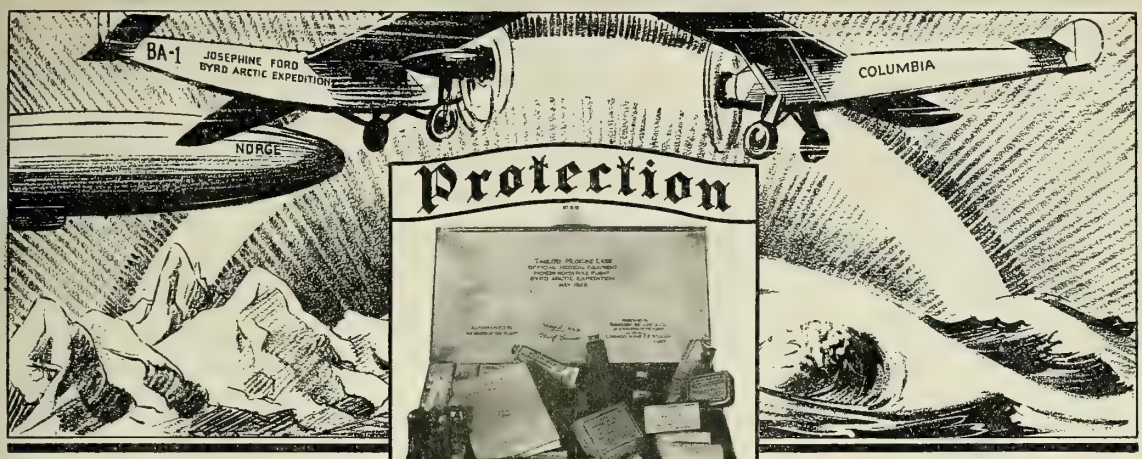
We have a plan worked out in detail.

We are serving a number of prominent clients in the aviation field and are now prepared to extend our service to a few additional manufacturers and operators. Our active association with aeronautic matters and our reference files are of very practical value.

REIMERS & OSBORN, Inc.

Advertising

285 MADISON AVENUE, NEW YORK



'TABLOID' FIRST-AID and MEDICINE CASE

Carried by Commander R. E. Byrd on his Historic North Pole Flight, May, 1926.

Great Achievements
and 'TABLOID' FIRST AID!

IT is not just a coincidence that the equipment of the famous flights of Byrd and Chamberlin included

'Tabloid' First-Aid.

It is but natural when planning such flights to include only absolutely dependable, portable equipment. The indorsement of these brave pioneers of the air means much more than any arguments we could advance as to quality.

You too can secure the same protective service by using **'Tabloid' First-Aid.**

A Few of the Many Famous Flights in Which 'Tabloid' First-Aid Figured

Byrd—North Pole and Trans-Atlantic Flight
Chamberlin — Trans-Atlantic Flight
Wellman Balloon Flight—1910
U. S. Army — Round the World Flight
U. S. Army—Pan American Flight
U. S. Navy—N.C.-4 Flight

BURROUGHS WELLCOME & CO., (U. S. A.) INC.
9 & 11 EAST FORTY-FIRST STREET, NEW YORK CITY
Associated Houses:
LONDON (ENG.) MONTREAL SYDNEY CAPE TOWN MILAN
BOMBAY SHANGHAI BUENOS AIRES

"Keep your 'Tabloid' First-Aid complete by maintaining a reserve supply of refills."



Please send me
'TABLOID' FIRST-AID Booklet
Firm Name .....
Address .....
.....
Individual's Name .....
Official Capacity .....

Say you saw it in AERO DIGEST

(*Continued from page* 512)

RANKIN SCHOOL OF FLYING
Portland, Oregon
Booth 144-B

SAN DIEGO AIR SERVICE CORPORATION
San Diego, California
Booth 163

Interesting photographs will be displayed and literature distributed showing the activities of the school.

SHORT'S SCHOOL OF AVIATION
Gardenia, California
Booth 158

WESTERN COLLEGE OF AERONAUTICS
Los Angeles, California
Booth 155

STARTERS

ECLIPSE MACHINE COMPANY
East Orange, New Jersey
Booths 81, 82

HEYWOOD STARTER CORPORATION
Detroit, Michigan
Booth 85

The Heywood high pressure injection starter, suitable for aviation engines up to 800 h.p. will be displayed.

SUPPLY HOUSES AND DISTRIBUTORS

AERO CORPORATION OF CALIFORNIA
Los Angeles, California
Booth A C, 235

Two new model OX5 powered Eaglerocks, one bare airplane fuselage, a Hallett motor and a full line of accessories will be exhibited.

AERO SERVICE COMPANY
Los Angeles, California
Booth 248-C

AERO SUPPLY MANUFACTURING CO.
College Point, New York
Booth 172

AIRCRAFT HOLDING CORPORATION
Culver City, California
Booth 174-C

AUTOMOTIVE SALES, INC.
Los Angeles, California
Booth 184

BOOTH COMPANY
Los Angeles, California
Booth 127-A

BUNDY AIRPLANE COMPANY
Portland, Oregon
Booth 121

GEORGE R. CRAIG COMPANY
Los Angeles, California
Booth A C

CRAWFORD AIRPLANE COMPANY
Venice, California
Booth 64

GRAINGER AIRCRAFT COMPANY
Santa Monica, California
Booth A C

JOHNSON AIRPLANE & SUPPLY CO.
Dayton, Ohio
Booth 8

A general line of standard aircraft equipment and supplies, in addition to which will be featured a new line of Johnson products such as the Johnson safety leather belt, wheel streamlines, tail wheels, speaking tubes, helmets, etc.

H. C. LIPPIATT AIRCRAFT COMPANY
Los Angeles, California
Booth A C

Two Travel Air planes, one Warner motored and one OX-5 job, will be shown. Mr. H. C. Lippiatt, Travel Air distributor for Southern California, will be in charge assisted by Mr. R. C. Merriam, Mr. A. C. Luz and Mr. Ralph Montee. A demonstrator will be on the field at all times.

MILLER AIRPLANE PRODUCTS CO.
Los Angeles, California
Booths 87-A, 87-B

MUTUAL AIRCRAFT CORPORATION
Los Angeles, California
Booth A C

MARVIN A. NORTHROP AEROPLANE CO.
Minneapolis, Minnesota
Booths A C, 73

Five new Salmson engines, one German glider, one Avro Avian equipped with Handley Page slotted wings, and a number of instruments and accessories.

PACIFIC AEROMOTIVE CORPORATION
Los Angeles, California
Booths 192, 193, 194

SPILLANE COMPANY
Los Angeles, California
Booth 282-C

STANDARD MERCANTILE COMPANY
Los Angeles, California
Booth 159

WESTERN AUTO SUPPLY COMPANY
Los Angeles, California
Booths 59-A, 59-B

WHITE & WOOLSTON
Los Angeles, California

TIRES

GOODRICH TIRE AND RUBBER CO.
Akron, Ohio
Booths 11, 12

GOODYEAR TIRE AND RUBBER CO.
Los Angeles, California
Booths 95, 96

MOTOR TIRES, INC.
Los Angeles, California

WYNN TIRE COMPANY
Los Angeles, California

TOOLS

CLEVELAND PNEUMATIC TOOL CO.
Cleveland, Ohio
Booth 94

SNAP-ON-WRENCH COMPANY
Detroit, Michigan
Booth 5

TRANSPORT LINES

AMBASSADOR AIRWAYS
Santa Monica, California
Booth A C

BOEING AIR TRANSPORT, INC.
PACIFIC AIR TRANSPORT, INC.
Seattle, Washington
Booths 97, 98

A joint exhibit described under "Boeing Airplane Company".

CALIFORNIA AERIAL TRANSPORT CO.
Los Angeles, California
Booth 156

CALIFORNIA AIRWAYS
Los Angeles, California
Booth A C

MADDUX AIR LINES
Los Angeles, California
Booths A C, 116

UNITED AIR SERVICE
Los Angeles, California
Booth A C

WESTERN AIR EXPRESS
Los Angeles, California
Booth A C

A Fokker F-10 twelve passenger trimotored monoplane such as are in daily service between Los Angeles and San Francisco will be on exhibition, also Wright "Whirlwind" and Pratt & Whitney engines. A demonstration of air mail service will be given.

VARNISHES and LACQUERS

BERRY BROTHERS
Detroit, Michigan
Booths 23, 24

A full line of aircraft finishes including many new color combinations. Model planes finished in Lionoil and Berryloid will be on display and color cards and interesting literature will be distributed. The exhibit will be in charge of Mr. E. G. Richard, Mr. C. H. Adams and Mr. T. B. Colby.

E. I. DU PONT DE NEMOURS & CO., INC.
Wilmington, Delaware
Booth 27

(*Continued on next page*)



. . . . at the world's largest school of flying . . .

there's year 'round training. Located in a large city in the mild Williamette Valley, flying is carried on virtually every day in the year amid the scenic wonders of America's playground, the storied Oregon country. This is but one of the many reasons why more students are enrolled here than in any other school.

International authorities point to the famous Rankin System of Flying Instruction, originated and perfected here, as the finest known pilot's course. New methods are constantly developed out of years of experience in teaching others to fly.

Under the personal supervision of "Tex" Rankin, a corps of instructors teach you how to fly right on new production planes, licensed by the Department of Commerce.

Mail the coupon below today for full information about the special advantages to be had at this celebrated school.

Outline of Course

GROUND SCHOOL

Aviation History
Theory of Flight
Practical Flying
Aviation Engines
Structures and Rigging
Navigation
Aerology
Air Commerce Law
Business Administration
Engine Laboratory
Rigging Laboratory

FLIGHT SCHOOL

Turns
Glides
Stalls
Approaches
Spirals and "S" Turns
Take-offs
Landings
Side-slips
Cross-wind landings and take-offs
Recovery from accidental spins
Simulated forced landings
Wing-overs
Rolls
Loops
Spins
Landing to mark
Cross-country

RANKIN SCHOOL OF FLYING

PORTLAND OREGON



Rankin School of Flying
Rankin Airport, Portland, Oregon

Tell me about the special advantages of your school.

Name .....

Address .....

City ..... *State*.....

(*Continued from preceding page*)

THE GLIDDEN COMPANY
Cleveland, Ohio

MURPHY VARNISH COMPANY
Newark, New Jersey
BOOTH 20

MISCELLANEOUS

AIRWAY MARKERS
Detroit, Michigan
BOOTH 125

ALLITH PROUTY COMPANY
Los Angeles, California
BOOTH 127

CALIFORNIA COMPRESSED GAS CO.
Los Angeles, California
BOOTH 4

CLARENCE E. CONDON
San Francisco, California
BOOTHS 233, 234

DUCCOMMUN HARDWARE CORP.
Los Angeles, California
BOOTH 288-A

DEPARTMENT OF COMMERCE
Washington, District of Columbia
BOOTH 50

A. R. EBRITE
Long Beach, California
BOOTH 38

T. E. ESSIG COMPANY
Los Angeles, California
BOOTHS A C, 249

B. HAYMAN
Los Angeles, California
BOOTH 13

HANNITOY, INC.
Los Angeles, California
BOOTH 262-C

NICK HARRIS
Los Angeles, California
BOOTH 28

HEATH & HEATH
Los Angeles, California
BOOTH 288-D

LOS ANGELES FIREWORKS COMPANY
Los Angeles, California
BOOTH 74

NATIONAL AIR PILOTS ASSOCIATION
Cleveland, Ohio
BOOTH 271

NATIONAL AERONAUTIC ASSOCIATION
Washington, District of Columbia
BOOTH 49

PACIFIC RADIUM APPLICATION CO.
Los Angeles, California
BOOTH 290

H. H. ROBERTSON COMPANY
Pittsburgh, Pennsylvania
BOOTHS 117, 130

SHAW PALMER AND BAKEWELL CO.
Los Angeles, California
BOOTHS 239, 256

SAFETURN SIGNAL COMPANY
Los Angeles, California
BOOTH 253

SIDNEY BLUMENTHAL, INC.
New York City, New York
BOOTH 9

S. TERRANISHI AND COMPANY
San Francisco, California
BOOTH 240

W. HARRIS THURSTON
New York City, New York
BOOTH 135

SMITH-BOOTH USHER
Los Angeles, California
BOOTH 133

MAGAZINES

The following publications will have booths at the Exhibition: AERO DIGEST (Booths 258, 273-C); Air Travel News (Booth 272); Airway Age (Booths 260, 261, 273, 273-A); Aviation (Booths 264, 267); Pacific Flyer; Western Flying (Booths 257, 274).

BROWNBACK

The Brownback Motor Laboratories, Incorporated

will exhibit at the

Los Angeles Aeronautical Exposition

an improved type

RADIAL AIRCRAFT ENGINE

3 cyl.—35 h.p.
6 cyl.—80 h.p.
10 cyl.—120 h.p.

BROWNBACK MOTOR LABORATORIES, Inc., D-1038 Graybar Building, New York.
Pacific Coast Representative: C. C. Ludlow, 843 So. Grand Avenue, Los Angeles.
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A few of the Famous Aviators who have chosen

THE NEW VEEDOL MOTOR OIL



COMMANDER BYRD
Conqueror of the Atlantic and the North Pole



BERNT BALCHEN
Trans-Atlantic Pilot and rescuer of the crew of the Bremen



MARTIN JENSEN
Trans-Pacific Flyer, Pilot of the famous Aloha in the Dole Races



EDDIE STINSON
Famous Pilot . . . President, Stinson Aircraft Corporation



THEA RASCHE
Famous German Aviatrix who plans Trans-Atlantic hop



MEARS AND COLLYER
Establishers of new round the world record of 23 days, 15 hours and 21 minutes

The New Veedol is a 100% lubricant because made 100% from Pennsylvania and other paraffine base crudes. It's tougher, heavier, super-heat resisting. Look for the orange and black Veedol sign. Tide Water Oil Sales Corporation, New York City.

Lasts longer . . . Keeps cooler

Made 100% from Pennsylvania and other Paraffine Base Crudes

Try the

NEW VEEDOL

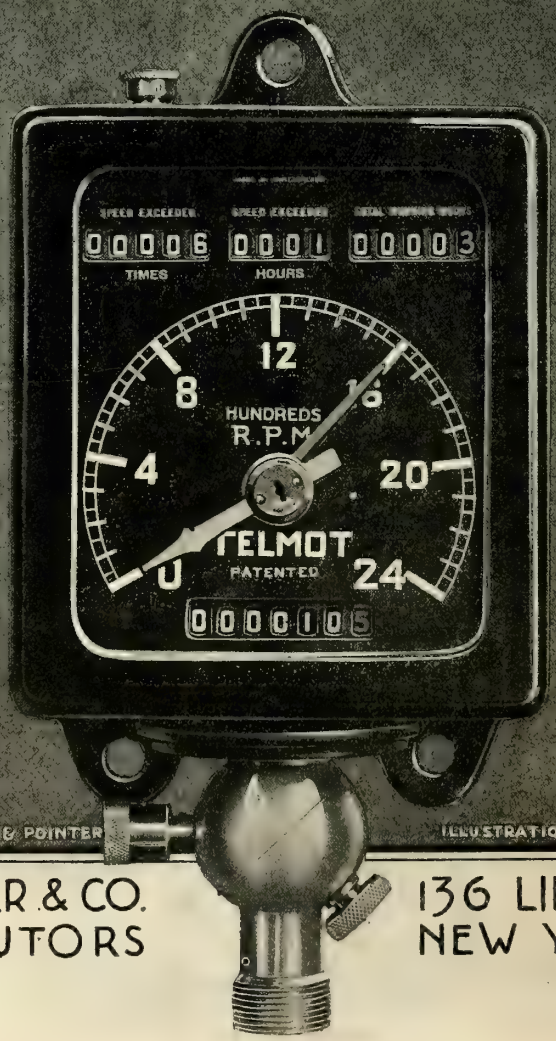
To-day

THE HASLER TELMOT FLIGHT-O-METER

REGISTERS AND TOTALIZES

DAILY
WEEKLY
MONTHLY
YEARLY

1. ELAPSED ENGINE HOURS
2. ELAPSED ENGINE REVS
3. MAX. ENGINE SPEED
4. ENGINE AIR MILES
5. HOW OFTEN ENGINE WAS OVERSPEEDED
6. HOW LONG ENGINE WAS OVERSPEEDED



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Before and After the Races . . . . .



AIR ASSOCIATES INC.

Complete Plane and Motor

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(P. O. Box 333, Garden City, L. I.)

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From Start to Finish . . . .
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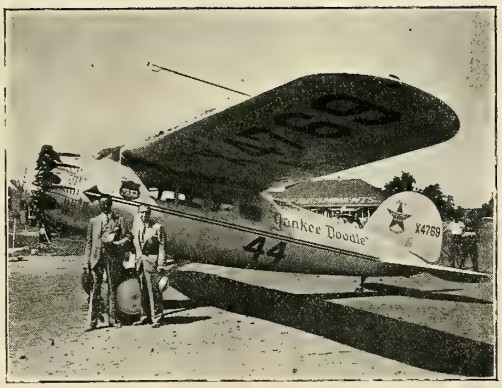
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of the Record Breaking

LOCKHEED VEGA

Also AVRO "Avian" and DRIGGS "Dart"

535 Fifth Ave., N. Y. C.

AIR ASSOCIATES INC.



Say you saw it in AERO DIGEST

NATIONWIDE RESPONSE!



The map reproduced here hangs in the office of the Aeromarine-Klemm Aircraft Corporation. Each pin represents a response to a quarter page advertisement that appeared in the May issue of AERO DIGEST.

The advertisement appeared *only* in AERO DIGEST.

A total of 272 replies was received within eight weeks of its appearance.

Note the distribution of the pins! Replies were received from *every* locality identified with active aircraft operation or manufacture.

Here is visible proof that AERO DIGEST is read *wherever aircraft are built or flown by the men who build and fly them.*

Advertisers in AERO DIGEST are directing their messages to the largest and most responsive group of men in the aircraft industry.

Average net paid circulation, first six months of 1928, was

51,958 PER MONTH

Further particulars about AERO DIGEST and the markets it covers will be gladly sent upon request.

AERO DIGEST

The leading publication of the aircraft field.

Publication Office: 220 West 42nd Street, New York, N. Y.

AERONAUTICAL CHAMBER OF COMMERCE

Advertising representatives:

L. F. McClure
720 Cass Street
Chicago, Ill.

Frank E. Samuels
1129 Mohawk St.,
Los Angeles, Cal.

Henry C. Pragoff
80 Boylston St.,
Boston, Mass.

Harry E. Hyde
548 Drexel Bldg.
Phila., Pa.

Ambassador Hotel
New York City

August 20th, 1928

The B. G. Corporation,
136 West 52nd Street,
New York City.

Gentlemen:

We would like to express our appreciation for the consistent manner in which the B. G. Plugs in our 'Wasp' motor performed.

We have always had a great deal of confidence in your products, and after seeing them come through this severe test on our flight from Los Angeles to New York in 18 hours and 58 minutes, we are more enthusiastic than ever, and wish to congratulate you on their dependability.

Very truly yours,
Arthur Goebel
Harry J. Tucker

Some Other Outstanding 1928 Achievements B. G. Equipped

National Air Tour, John P. Wood, winner.
National Air Tour, David Levy, only perfect score.
Mears-Collyer, Round-the-World flight.
Kingsford-Smith, California to Australia.
Curtiss Marine trophy race winner.
PN-12 Navy plane endurance and altitude records.
Captain George H. Wilkens, Polar flight.

* * * *

Commander Richard Byrd has specified B. G. Plugs for all aeronautical engines which he is taking on his South Pole expedition.



ACTUAL SIZE

B. G. "HORNET"

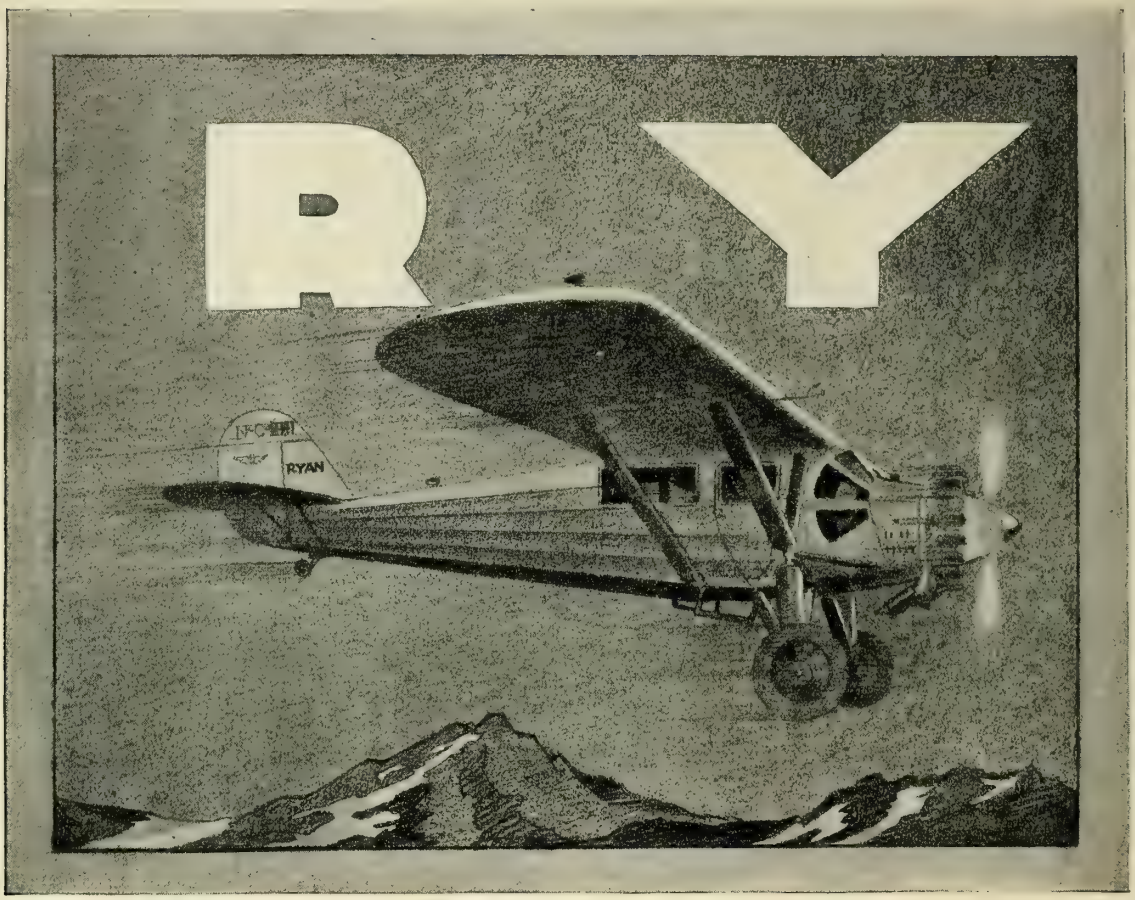
MICA SPARK PLUGS

THE B. G. CORPORATION

136 West 52nd Street New York, N. Y.

Contractors to U. S. Air Service and Aircraft Engine Builders.

SISTERSHIP TO THE SPIRIT OF ST. LOUIS



Always Doing the

THEY said it *couldn't be done.* So Vance Breese stepped into a standard *Ryan Brougham* on the morning of August 8th and, with a full load of passengers flew over Pike's Peak at an altitude of 17,000 feet. The next day, as if in answer to the unexpressed thought that it might have been luck, he carried camera equipment in addition to the four passengers and again flew over the famous summit.

Every day standard *Ryan Broughams* are doing the unusual . . . the impossible . . . work not even attempted with other planes. Taking off fields seven thousand feet above sea level with full loads and room to spare. Taking off faster and landing slower with full loads than any other Whirlwind cabin plane competitor anywhere, anytime. The Wright Whirlwind motor performs better *in the Ryan Brougham* because the Brougham was designed exclusively for the Whirlwind motor.

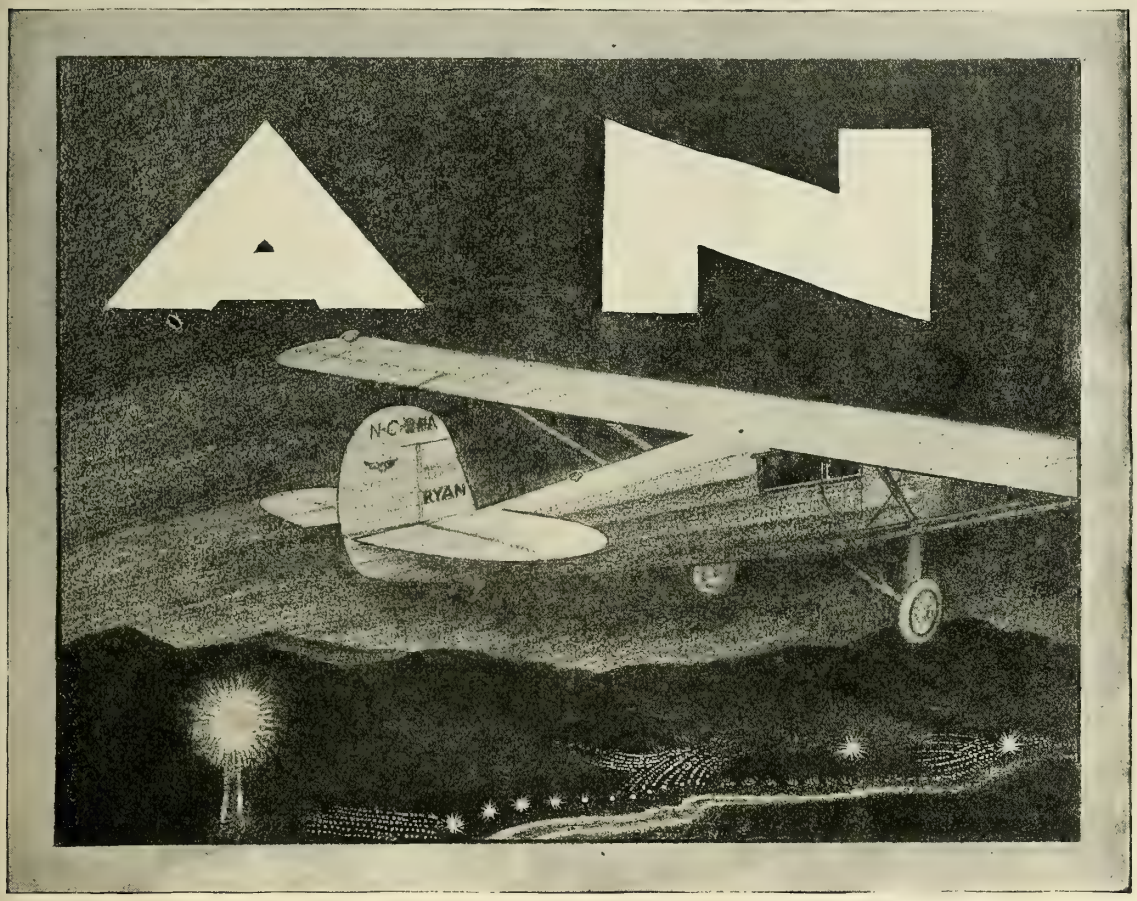
Performance alone is not the only reason for the remarkable success of the *Ryan Brougham.* Construction, appointments and engineering do their share in keeping its builders, the *Mahoney-Ryan Aircraft Corporation,* the world's largest manufacturers of Whirlwind cabin planes. Fourteen hookless fastener inspection units . . . eight-inch Micarta tail wheels . . . tail shock load absorbed by twelve discs of live rubber . . . air and oil shock absorbers on the landing carriage . . . full upholstered spring seats . . . large sedan-type doors . . . these are a few of the features of the *1928 Ryan Brougham* which will be generally adopted by other manufacturers a year from now. *And the price!* . . . $12,200 fully equipped at the factory . . . with nothing more to buy.

THE MAHONEY-RYAN

Owners of Ryan Air Lines and Ryan Flying Company
San Diego, Calif.

Ryan Brougham—U. S. Dept. of Commerce Approved Type Certificate No. 25

SISTERSHIP TO THE SPIRIT OF ST. LOUIS



Impossible

RYAN BROUGHAMS are delivering the Los Angeles "Times" to San Francisco and Oakland, leaving after midnight, arriving at dawn with 800 pounds of newspapers packed in the cabin behind the pilot. Ground flyers and hangar hangers-on said it couldn't be done with a cabin plane... but *Ryan Broughams* are doing it on express train schedule, *every night.* No job is too big for a *Ryan Brougham!*

AIRCRAFT CORP'N

Owners of Kyan Air Lines and Ryan Flying Company
St. Louis, Mo.

DISTRIBUTORS:

MASSACHUSETTS AIRWAYS CORP'N	*Springfield, Mass.*
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BUFFALO AIRCRAFT DISTRIBUTORS	*Buffalo, N. Y.*
MENEFEE AIRWAYS, Inc.	*New Orleans, La.*
KNAPP FLYING SERVICE	*Ypsilanti, Mich.*
MIDWEST AIRWAYS, Inc.	*Milwaukee, Wis.*
NORTHROP AEROPLANE CO.	*Minneapolis, Minn.*
MIDWEST AIRWAYS CORP'N	*Monmouth, Ill.*
BEACON AIRWAYS OF AMERICA, Inc.	*Kansas City, Mo.*
INTERSTATE TRANSIT LINES	*Omaha, Nebraska*
RAPID AIR-LINES, Inc.	*Rapid City, So. Dakota*
SOUTHWEST RYAN AIRLINES, Inc.	*Tulsa, Oklahoma*
SCENIC AIRWAYS, Inc.	*Phoenix & Grand Canyon, Ariz.*
MISSION AIRPLANE SERVICES	*San Antonio, Texas*
THOMPSON FLYING SERVICE	*Salt Lake City, Utah*
MUTUAL AIRCRAFT CORP'N	*Los Angeles, Calif.*
RANKIN FLYING SERVICE	*Portland, Oregon*
M. A. ZUNIGA	*Central America*
COUNT G. BONMARTINI	*Rome, Italy*

The valuable Mahoney-Ryan franchise is available only to operators and qualified business executives.

Kyan Broughams equipped with latest type Edo Pontoons... $14,000 at the factory.



Ryan Brougham—U. S. Dept. of Commerce Approved Type Certificate No. 25.

Say you saw it in AERO DIGEST

WESTERN NEWS

THE PROFESSIONAL PILOTS ASSOCIATION

By Waldo D. Waterman

THE Professional Pilots Association is now entering upon its seventh year of successful functioning. In 1921 a small group of aviators met in the office of one of the Los Angeles airports to discuss problems of aviation with particular reference to those effecting the pilots themselves. It was the desire of this group to form an association for the betterment and advancement of aviation. It was generally felt that four principal things were at that time retarding the progress of the art. These were lack of experience or skill on the part of many pilots; the use of unairworthy craft; the reckless manipulation of airplanes, such as stunt flying and flying in unnecessarily low altitudes; and the lack of air-mindedness on the part of the public at large.

It was decided at this time to form an organization that would assist in eliminating these drawbacks and to that end the Professional Pilots Association was organized.

The original by-laws required that all members must have flown at least four years prior to becoming members; that they must be skilled in the art and temperamentally fit for the occupation in which they were engaged. It was further required that all members should refuse to fly craft whose airworthiness was questionable. Stunt flying and acrobatics of all sorts were prohibited when carrying passengers for hire or reward.

Educational campaigns were conducted by the use of radio, personal contact and the reporting of the true causes of airplane accidents to the press.

Our first president, G. G. Budwig, at present Chief Inspector of the Aeronautical Branch of the Department of Commerce, was one of the prime movers in the organization of the association and the drafting of its by-laws. Since then his good work has been carried on by his successors, the following presidents: H. E. Patterson, Waldo D. Waterman, Boyd M. Shelton, E. A. Ballande, C. O. Prest.

Upon the enactment of the Air Commerce Act of 1926 many of the functions of the Professional Pilots Association were carried to a further realization. It is interesting to note that a member of the Professional Pilots Association, abiding by its rules, regulations and by-laws would in all respects be conducting himself as required by the air commerce laws which were later inaugurated.

Our association has gone further. It has established a bond of friendship and good fellowship amongst its membership which is rapidly demolishing much of the petty jealousy and strife amongst groups of airmen where the association functions. It has created a mutual insurance fund by which its members are enabled to get insurance at exceedingly low rates.

We point with pride to our record of the last seven years, in that our membership has flown an aggregate of 25,000,000 miles. With the exception of one accident no one riding in an airplane piloted by a member of the association has ever lost his life or been seriously injured through crash, nor has any member of the association lost his life or been injured in such a manner with the one exception. This exception was a case of one of our membership testing a new type of airplane of radical and freakish design and construction, in which the designer, his wife and son, were passengers. While in a normal glide, aileron and wing flutter set in, tearing one of the wings from the plane, killing all of the passengers. We have had three other deaths in the organization. One was the sad case of Fred Hoyt who was frozen to death in Idaho after leaving his plane, with a parachute in a severe storm; our second president, Howard E. Patterson, passed away from an attack of heart failure after a year's sickness, and Kenneth Montee died of scarlet fever while on a mapping expedition at the Mexican border.

Such a record for an association with so large a membership is certainly to be envied. We at present have members all over the United States, although the largest and most active group is at Los Angeles.

During the National Air Race week in September it is the desire of the association to expand its membership and organize chapters at every important aeronautical center where five or more air pilots that can qualify are operating. The night of September 14 has been set aside by the Air Race Association program committee for the purpose of holding a stag dinner at which all air pilots in Los Angeles at that time, whether members or not, are invited to attend. The program will be split into two sections. A half an hour will be devoted to business of the association, and the rest of the night will be turned over to the organization's entertainment committee. Some red hot entertainment is promised. All of the entertainers will have approved type certificates and be certified airworthy. As hosts, the Professional Pilots Association wish to get in touch with every air pilot that will be at the air races, through the secretary, Palmer Nichols, 3417 Mesa Drive, Los Angeles.

AERIAL LAW LECTURES

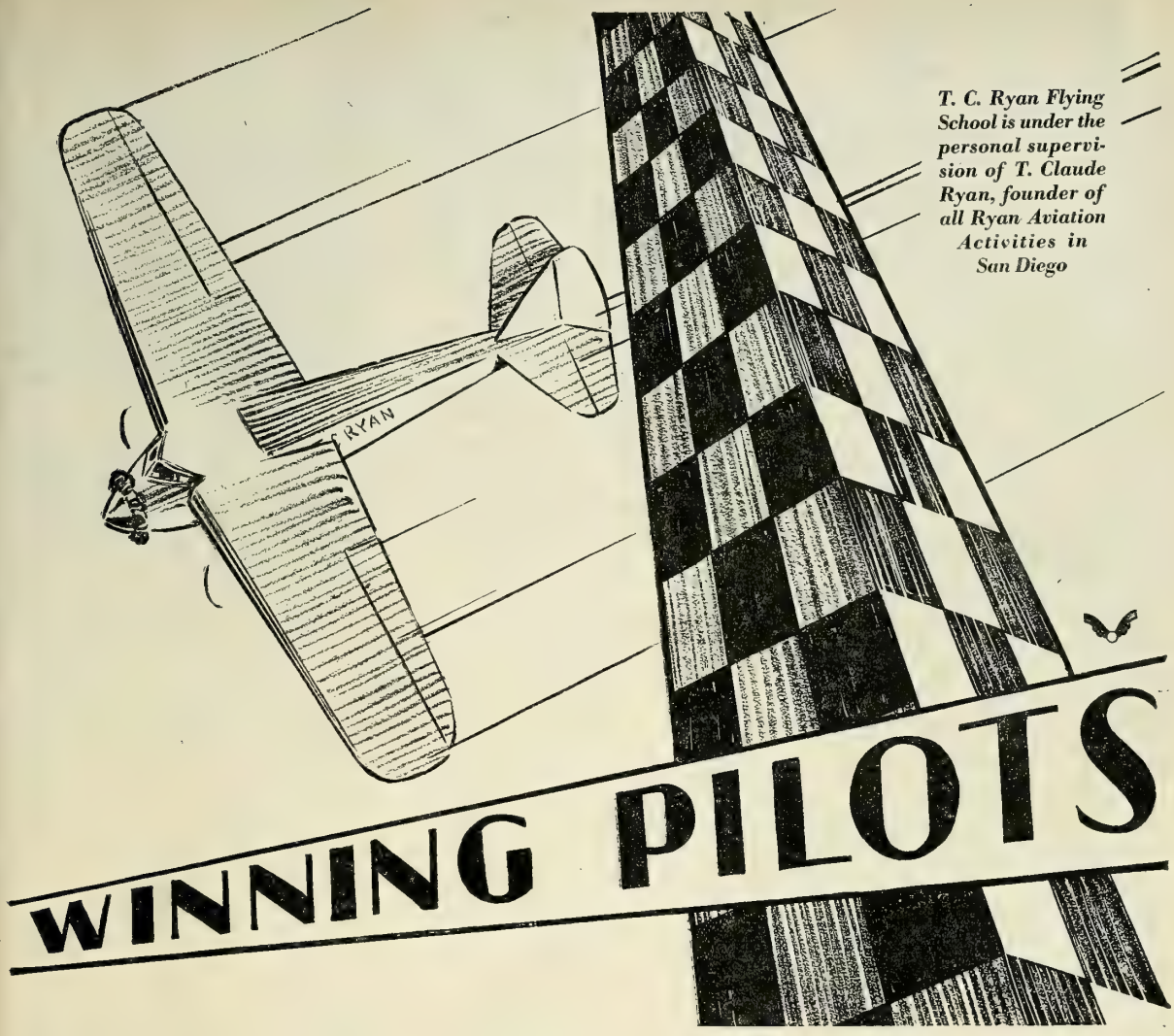
DR. OTTO H. SCHREIBER, head of the Institute of Air Law at the University of Koenigsberg, Germany, gave a lecture course in Air Law, August 13-18, during the second half of the summer session of the School of Law of the University of Southern California, as a result of a special Lectureship established by the Union Oil Company of California.

Dr. Schreiber was invited to the United States by the University of Virginia and the University of Southern California. He first conducted an aerial round table at the Institute of Public Affairs, Charlottesville, Va.

Of the nations of the world, Germany was the first to devote serious attention to aerial law. Dr. Schreiber has conducted his Institute of Aerial Law at Koenigsberg since 1919. The only other university activities in Europe having aerial law departments are those at Rome, Genoa and Paris.



One of the 12 passenger, trimotored Fokkers used on the Los Angeles-San Francisco division of the Western Air Express.



T. C. Ryan Flying School is under the personal supervision of T. Claude Ryan, founder of all Ryan Aviation Activities in San Diego

WINNING PILOTS

Winning Pilots are Trained Pilots!

Men who succeed in any field are men who have been thoroughly trained for the task they seek to accomplish.

The T. C. Ryan Flying School, since its inception has always held Aviation to be a science, separate and apart. In preparing its students, men who will daily ply the airlanes, it has held that nothing short of perfection in training is adequate. Thus, at the outset was established the Ryan Ideal—"To Produce the Nation's Finest Pilots."

The ground school course is received at Pacific Technical University, an accredited educational institution. Training ships at the Ryan School are of the most modern, approved types. Ryan pilot instructors are men especially selected and trained. The school's location in San Diego grants a dual unparalleled advantage in that perfect year around flying conditions exist in San Diego, and here, in close proximity to Ryan Field, are located the great Army, Navy and Marine Corps Air Bases, which afford an excellent opportunity for student observation . . . With all these features the Ryan Course of Instruction costs no more . . . It merits your investigation. The coupon, below, will bring you the instructive and interesting catalog . . . *Send for it.*

T. C. RYAN *flying* SCHOOL

Affiliated with Pacific Technical University . . . . San Diego, California

I am interested in your course of Flying Instruction. Please forward your catalog.

AGE_____

NAME_____ ADDRESS_____

CONTACTS

By Frank E. Samuels

OVER two hundred members and guests were present at the Ambassador Hotel, Los Angeles, to attend the business meeting of the California chapter of the National Aeronautic Association and to pay homage to Sir Hubert Wilkins who recently returned from his wonderful flight over the North Pole. Among the notable pilots present were Capt. William Lancaster, who with Mrs. Keith Miller made the flight from England to Australia; Capt. Harry Lyon, navigator of the *Southern Cross* from California to Australia; Lieut. Henry H. Ogden, Army round-the-world flier; and Lieut. Lester J. Maitland, who made the first San Francisco-Honolulu hop.

Mr. D. F. MacDaneld, president of the N. A. A. chapter, presiding at the meeting, introduced each of the notables, who in turn told of some particular incident of their flying experience.

WHILE on the subject of banquets and meetings, I must not pass up the dinner and entertainment tendered to the press by the publicity committee of the coming air races and exposition. Seventy-five press representatives, the executive committee and the entire publicity committee of the air races met at the Alexandria Hotel and enjoyed a rattling good dinner and plenty of talented entertainment. Congenial Ham Beal presided during the session, introducing everyone to each other. Short talks by the heads of the aviation departments of the different newspapers and news services filled in nicely between the vaudeville acts.

THE Lockheed Aircraft Company's plant in Burbank is jumping ahead by leaps and bounds. Three new fire-proof buildings have just been erected; one a separate unit for painting the planes, one for assembling them and one entire unit for experimental work. A line of ships on the floor of the main building, under different stages of construction, is a credit to any manufacturer. 163 employees are engaged at the plant, and by the looks of the material being shipped in regularly and the large amount of it on hand, it looks as though it is the intention of the company to turn out at least three ships a week, in the near future. Visitors to the national races should pay a visit to the plant.

PAUL WHITTIER, all around sportsman and a real fellow, has just placed an order with the Aero Corporation of California for one of the new model Eaglerocks. This ship will be powered with a special airplane motor recently built by Harry Miller, of auto racing fame. We are looking forward to seeing some records fall by the wayside.

EDDIE MARTIN now has the Eaglerock agency for Orange and Riverside Counties and requires only enough deliveries to meet the demands to make him perfectly happy. For those not acquainted with the location of the Eddie Martin Airport, it is about three miles west of Santa Ana. The boys have installed an up-to-date machine shop, which is kept busy all the time. There are over forty students now taking instructions at the field in Eaglerocks and Waco-10s, which are used exclusively for instructions. Twelve planes make the field their headquarters at present, where there is hangar capacity for fourteen ships. The personnel consists of Eddie and Johnnie Martin, instructors; Charlie Jackson, chief mechanic, and Aldon Melzin, assistant mechanic. Visiting planes to the National Air Races should make a call at the field, as it is one of our largest and best, suitable for any size or type plane to land or take off from, and the Martin boys will always make you welcome.

THE Standard Airlines, operators of the Los Angeles-Tucson airline, which was formerly owned by the Aero Corporation of California, have opened an office at 107 West Ninth Street, where they are handling tickets for the line as well as tickets for airplane taxi service and local passenger flights at the Aero Corporation field.

WE have received a letter from the American Aircraft Corporation inviting visiting airmen to make the American Aircraft field their headquarters during the races. Underscored in red appears the following: "Park your ship free of charge at the American Airport during the National Air Races. Make this field your Los Angeles headquarters. No landing fee. Special accommodations and service facilities during the races. Direct transportation to the racing field." Boys, it seems as though everyone is trying to make your visit a pleasant one and one to be remembered.

A RECENTLY formed organization which gives promise of being beneficial to the entire aviation industry is the Aircraft Operators Association. Fifteen charter members held the original meeting and since then the membership has been augmented by more than double. The officers elected at the first meeting were Bob Blair, president; Jack Frye of the Aero Corporation of California; first vice president; Norman Sprowll, of the Ambassador Airways; Charles Dycer of the Dycer Airport, secretary-treasurer; Caden Jenkins, managing secretary. We are going to hear more from this group of live ones.

WHILE at the Rogers Airport the other day, three visiting planes from long distances landed inside of an hour—one from New York City, one from Seattle and one from Salt Lake City. The pilot of each plane spoke highly of the smooth, roomy flying field with its long runways, and each declared he would make his headquarters at the field during his visit to California. Jim Webster has some magnet that draws visiting aircraft, and he says he expects to have at least fifty visiting pilots make the field their headquarters during the races.

THE Buhl Pacific Aircraft, a new coast distributing organization, has taken over the assets of the Frank Baker Aircraft, including the flying field, where they will continue operations. The new company has the agency for the entire west coast of the Buhl Aircraft company products and will not handle any other make of planes. Bob Blair will continue as manager.

ANOTHER new distributing organization for the west coast is headed by Myhres and Smith under the title of California distributors of the Red Arrow Simplex monoplanes, with headquarters at the Montee hangar, Clover Field, Santa Monica. Mr. Myhres flew the first Junkers plane to California in 1910. They will have a Kinner-motored Simplex on exhibition at the show and have entered all the races for the coming meet that the little ship is eligible for.

ROSS HADLEY, president of the Aeromotive Corporation and one of the head executives of the Charles R. Hadley Company, printers of loose leaf booklets and stationery, recently purchased a Wright Whirlwind motored Stearman from James Webster, Stearman distributor for California. Flying the ship from the factory in Wichita to California, he made a number of side trips and reports perfect performances of both motor and plane.

BURDETT AIRLINES has been taken over and is being operated by the Master Aircraft Co., a partnership consisting of Jeff Warren and Bon Macdougall, both well known fliers on the Pacific Coast. Warren was one of the founders of International Aircraft and Macdougall was formerly with Burdett Fuller and Jack Frye at the old Burdett Airport. Macdougall will be remembered as a former speedway driver and founder of the "Thirteen Black Cats" of Hollywood. Many changes have been made by the new owners, who have disposed of all the Jennies and are now using new Swallows. New hangars are being erected and the field will be lighted for night flying. Burdett Fuller remains with the new organization as chief instructor.

WESTERN COLLEGE OF AERONAUTICS has donated the services of fifty of its students to service the racing planes during the races. The students will be available at all times and will be considered an official service organization for the races. This will familiarize the students with the different makes of planes and motors and will of course be of great help to the visiting pilots.

ALTHOUGH not opening until October 1, the management of the L. A. Metropolitan Airport at Los Angeles announces that reservations for twenty-five sites are already on hand from various aircraft people. Among these are the Bach Aircraft Company, O. W. Timm Airplane Company, West Coast Air Transport Company, Shelton Air Service, H. C. Lippiatt, Roy Wilson, Richfield Oil Company, Pacific Aeromotive Corporation, R. C. Miller, Eagle Flying School, Granger Aircraft Company, Crown Aircraft Company and Adrian Cornell.

Buy MILLER

AIRPLANE PRODUCTS



REV'S FOR OX5's
By LESLIE C. MILLER
A book explaining all faults of the OX-5 Curtiss motor and the remedy for each fault. How to get more horsepower, efficiency, reliability and economy out of this type motor. The author has over 3500 flying hours experience with the OX-5.
PRICE ONE DOLLAR

Dealers Wanted

MILLER'S POSITIVE INTAKE VALVE CONTROL FOR OX'S

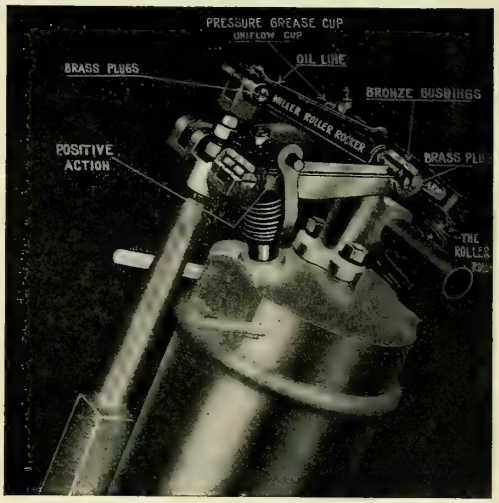
Saves 15% on gas, adds 20 to 50 rev's to the motor speed, takes all noise from the overhead, greatly reduces friction in pins, bearing surfaces, valve guide and pull rod. Over two thousand sets now in use on OX's in planes, speed boats and racing cars.

PRICE per set of eight $10

MILLER'S ROLLER ROCKER ARMS

Prevents wear on exhaust valve guides and seats because the roller rolls freely across the valve stem end, instead of sticking and exerting a side pressure on the guide and seat as is the case with the former tappet. More power longer sustained.

PRICE $15
Per Set of Eight



THE MILLER OVERHEAD

The large pins operate on Bronze Bushings, all pins are oiled under constant pressure from Cincinnati Ball-crank uniflow lubricators.

The system is guaranteed to give twice the service of former OX overheads. It is impossible for the pins to lose out or for grit to get into the bearing surfaces.

Roller Rocker Arms and intake controls are included in the Miller Overhead.

With push and pull rods	$90.00
Price per set, less rods	85.00
With alemite connections, but less Lubricators; with rods	78.00
Without rods	73.00

THE MILLER VALVE GUIDE REMOVING AND REPLACEMENT TOOL SET

A complete equipment for removing and replacing valve guides in old cylinders; all operations by hand, no machinery necessary. Many discarded cylinders can be put back in the service with this set.

Ream out the old valve seat and use oversize head valves. We have the valves.

Valve guide tool set	$35.00
Grey iron guides	.65
Valve seat Reamer set, all necessary reamers	22.50

Don't fail to visit our Booth No. 87 in the Engine Department, Los Angeles Air Races, Sept. 8th to 16th

Write for pamphlet fully describing all Miller Products

MILLER AIRPLANE PRODUCTS ARE SOLD ON 30 DAYS' TRIAL. REFUND ON ANY UNSATISFACTORY PURCHASES

MILLER AIRPLANE PRODUCTS

Write P. O. BOX 643, LOS ANGELES, CALIF., FACTORY, 3827 WEST JEFFERSON

Terms 5% discount for cash with order. 10% deposit required on all orders. Write your supply house or order direct.

FACTORY REPRESENTATIVES

Nicholas Beazley Airplane Supply, Marshall, Mo.
Logan Aviation Supply, 716 West Superior, Cleveland, Ohio
Johnson Airplane Supply Co., Dayton, Ohio
Robertson Aircraft Corporation, Anglum, Mo.

CALIFORNIA AIR NEWS

A RAPID increase in the number of small party charter trips by air, and the value of moderate sized planes to handle the "overflow" business of airlines using large ships, are responsible for the purchase by Maddux Air Lines of the two California-built Lockheed monoplanes.

Extending the southern terminal of Maddux Air Lines from San Diego to Agua Caliente, the first international airline out of any American city, has met with instantaneous success, due partly to the fact that it is a short, quick, convenient week-end trip to make. The service is daily.

COÖPERATING with the Board of Supervisors of San Luis County in the development of airports, the Union Oil Company has agreed to furnish a site for a temporary aviation field near San Luis Obispo until such time as the County acquires its own airport. The offer has been accepted by the Supervisors and the work of clearing and leveling the tract will commence immediately.

The site of the landing field forms a part of the Union's tank farm, and is located about two miles south of San Luis Obispo and approximately 2,000 feet due east of the Coast highway.

The field covers an area of around 60 acres, and is about 2,000 feet long by approximately 1,200 feet wide. Present plans call for the establishment of a runway 2,000 feet long with the possibility that a second will be added later.

Home on High—No Place Below

HE'S got wings and no place to go.

When Eric Nelson, famed round-the-world flier, registered at a San Francisco hotel, he left the 'address' line blank. The clerk asked for the name of his home town and the airman was stumped.

"I haven't any", he said.

Nelson arrived at San Francisco recently, piloting a large Boeing trimotored liner just completed at the factory of the Boeing Airplane Company in Seattle, with which he was recently associated as sales manager. At the controls with him was "Slim" H. T. Lewis, 225-pound airmail flier on the Omaha-Cheyenne division of the Transcontinental.

Nelson flew around the world with the Army, touching 22 foreign countries, hopped from the United States into Alaska and to Porto Rico. He is said to have flown more foreign miles than any other American.

REDUCTION of air mail rates to five cents per first ounce has already resulted in a new peak load of 621 pounds of eastbound air mail in one day from the San Francisco bay region, W. G. Herron, vice president of Boeing Air Transport, operating the San Francisco-Oakland-Chicago route, announced. This is nearly double the former average eastbound air mail load of 340 pounds per day.

Pacific Air Transport figures for the same date as the eastbound peak load, show 206 pounds of mail flown south from Portland, including Seattle mail, and 189 pounds dispatched north from Los Angeles, those totals also representing a 100% increase. Northbound air mail from San Francisco now averages more than 100 pounds daily as compared to a former average of 55 pounds.

THE Wings Aviation Club was organized recently in Los Angeles by a group of World War Veterans. The purposes of the club are to promote aviation in general, to teach members to fly, and to enable members who have already made solo flights to get the fifty hours flying required by the Department of Commerce regulations for a pilot's license. Membership is open to both men and women. Wynn Blaisdell, 940 S. Flower Street, Los Angeles, is the secretary.

THE Service Steel Company of Detroit, Mich., is installing an office and warehouse at 216 North Alameda Street, Los Angeles, and will be prepared within a short time to offer a complete warehouse and mill service on seamless steel tubing in low carbon and in all of the popular aircraft grades. The company will carry a substantial stock of all of the popular sizes in order better to serve its customers in the West.

Ryan Brougham Production Record

EXCEEDING all previous records for orders received in a single day, the Mahoney Aircraft Corporation accepted on July 23rd, orders and deposits on eight Ryan Broughams. Orders for three of the Broughams were placed through M. A. Zuniga, Central American representative of the Mahoney Company, and are to be delivered to the Guatemalan Government. Another Brougham is to go to the government of China; three more to the Mutual Aircraft Corporation of Los Angeles for Pacific Coast distribution; and one for the Northrop Airplane Services of Minneapolis, Minn. With the opening of the Mahoney Aircraft Corporation's plant at Anglum, Mo., the Ryan Brougham production of twenty monthly will be increased to thirty.

THE George R. Craig Company, Inc., has been assigned the state distributorship for California, Arizona, and Nevada for the Mohawk "Pinto" low wing monoplane. The personnel of the firm consists of George R. Craig, Steven Stewart, and Allen L. Patterson. It is the object of the company to establish 100 per cent sub-dealers, in order to eliminate close competition between the distributor and the sub-dealer, and thereby create more stimulative sales. They plan to extend operations to include the distribution on the Pacific Coast of other aircraft and aircraft equipment.

THE Union Oil Company, one of the first of the oil companies on the Pacific Coast to invest in an airplane purely for business purposes, has purchased three more planes, giving it a fleet of four ships.

These planes are to be used as utility equipment in the general conducting of the company's business, especially the contacting of the ever increasing aviation trade on the Pacific Coast.

The aviation activities of the Union are under the direction of C. F. Lienesch, manager of technical relations, who maintains technical records of the operations of the planes to form a guide for subsequent development of this form of transportation within the company.

THE O'Donnell School of Aviation at Municipal Airport, Long Beach, Calif., was started the last of January in 1928, with about four students. Since that time, the school has enrolled ninety students, is operating two OX5 Wacos, and is completely refinishing a Fokker Universal cabin plane for passenger and cross-country trips.

The school course consists of 12½ hours of actual flying and complete ground school training in navigation, meteorology, construction and motor work. Lloyd O'Donnell is instructor in navigation and flying, Franklin L. Wallace instructs in construction, engineering and meteorology, and Clyde Downen in motor work, theory and practice.

THE Aero Corporation of California, local Eaglerock and Fokker distributors, has announced that new model Eaglerocks have received the Approved Type Certificate issued by the Department of Commerce. Accordingly, Eaglerocks powered with the OX5 or the OXX6 have Approved Type Certificate Number 58, while those powered with the Whirlwind and Hissos have Certificates Numbers 57 and 59 respectively.



Pilots and instructors of the Aero Corporation of California

Paul E. Richter, Jr., Lee Willey, Charles Witmer, Lee Flanigan, Harvey Bolton, Jack Frye.

Say you saw it in AERO DIGEST

L. A. METROPOLITAN AIRPORT

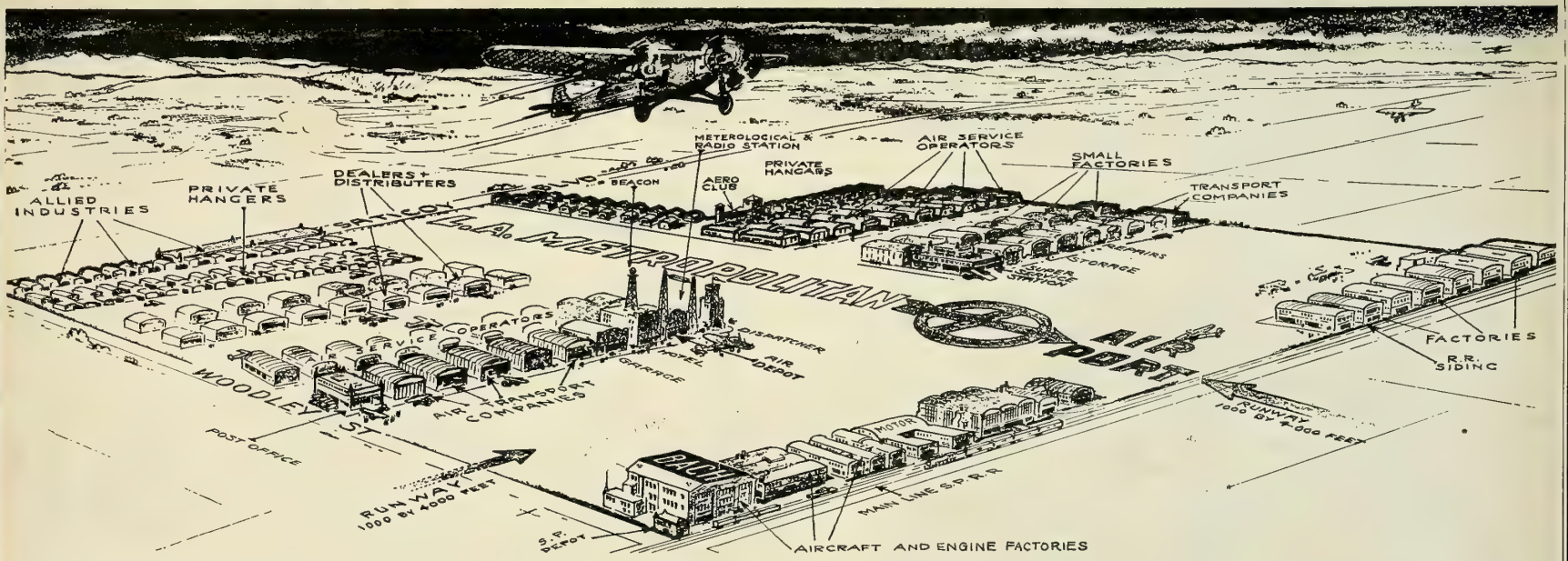
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Reservations now on file for twenty-six sights, from Bach Aircraft Co.; O. W. Timm Airplane Co.; West Coast Transport Co.; Richfield Oil Co.; Pacific Aeromotive Corp.; Shelton Aero Service; H. C. Lippiat; Roy Wilson; Eagle Flying School; Crown Airplane Co.; Granger Aircraft Co.; R. C. Miller.; Adrien Cornell; Standard Airlines, Inc.; Driggs Airplane Company; Continental Maping Company.

Sights may be leased, purchased or leased with option to purchase on this field, the first permanent airport in Los Angeles.

L. A. METROPOLITAN AIRPORT CO.

SACRAMENTO NOTES

By Ralph K. Clark

THE Goddard Aircraft Corporation of Reno, Nevada, has taken steps to enter the California field by filing articles of incorporation with Secretary of State Frank C. Gordon. The company is organized to serve as a common carrier of passengers, freight and mails.

Directors of the corporation are F. C. Morton, C. J. Borghi, E. Armstrong, L. G. Wilson, M. Frank, T. L. Smith and P. A. Burke, all of Reno.

A RESOLUTION of intent to purchase eighty acres of land near Willows, Glenn county, for airport purposes was passed by the Willows Board of Supervisors. The county is putting up half of the money for the purpose and the town will put up the remainder. Government mail and private planes will use the airport as a landing field.

THERE are eighty-five students being given instruction at Sacramento. Andrews, Nicholson and Morris, municipal airport, have thirty-two students; Ingvald Fagerskog, municipal airport, twenty-five students; Leo Moore, municipal airport, seven students; A. F. Mickel, municipal airport, three students; and the Eaglerock Airlines, Eaglerock Airport, eighteen students.

THE Union Air Line, Inc., of San Francisco, has acquired the Capital Air Lines of Sacramento, and will immediately institute a daily airplane service between this city and Mills Field, San Francisco. The daily service will be increased, as soon as two new ships arrive, to twice daily and the line will be extended to Redding, Shasta county.

The Union Air Line, Inc., is owned by the holders of a large interest in the Pickwick stage line and the owners of the West Coast Air Transport company.

The Capital Air Lines was recently formed by Royal Miller, W. I. Elliott, H. G. Andrews and C. E. Wilkins. They placed a Breese monoplane on a tri-weekly schedule between here and San Francisco. Andrews, it is understood, will remain with the new company as the local manager.

OAKLAND AIR NEWS

By H. Kitson

WITH the addition of several new organizations to its roster, the local airport seems to be acquiring added momentum with each day's business. Undoubtedly the most important acquisition is that of the Western Air Express, Inc, which has transferred its headquarters from Mills Field. The Maddux Airlines is now the only major organization maintaining headquarters at Mills Field and has announced that Oakland will be added to the schedules of all planes as a regular stop.

Another important addition is that of the Union Air Lines Company which is offering daily passenger service between Portland, Spokane and Salt Lake, and Salt Lake and the bay district. Headquarters are established in Portland. The Capitol Airlines recently inaugurated service between Oakland and Sacramento, the state capital. At present the line is operating three days a week but H. G. Andrews, chief pilot of the company, announced that the organization is anxious to establish daily service and will do so as soon as business warrants. The Ambassador Airways recently shifted the scene of their operations from the Santa Monica field in Southern California to the local port, and will engage in a general taxi service. In addition to the above organizations the local airport is headquarters for the Boeing Air Mail, the Pacific Air Transport, the Pacific Mail and the Mutual Airlines as well as numerous smaller organizations engaged in taxi and instruction work.

AN Oakland plane and pilot have been credited with saving more than 20,000 acres of timber from destruction during a recent fire near Red Bluff. Operating from the Oakland municipal airport, Roy Patterson, of the Pacific Coast Air Service, which holds the forest patrol contract, aided George McGowan, forest ranger, in directing the work of the far flung line of 500 fire fighters.

A NEW booklet containing the flying regulations, ground rules and rates in effect at the Oakland municipal airport has been published by the board of port commissioners. Copies of the booklet may be obtained from the Board of Port Commissions, Oakland Bank Building, Oakland, Calif.

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CRAWFORD AIRPLANE SUPPLY CO.

We are now entering upon an expansive program and until our new building is completed we are pressed for room. The following stock must be moved at these reduced prices.

200-13 volt, 32 amp. streamline wind driven generators, complete with storage batteries, automatic cut-outs, and propellers. Original cost was $120. Money back guarantee $35

300 Brand new storage batteries, 6, 10, and 12 volts $15

500 Jaeger, Reliance and Warner tachometer heads, $15; with cables and adaptors, each.....$20

Air speed indicators, complete.....$25

Dual magneto switches, each .....75c to $2

Pioneer turn and bank indicators.....$35

Altimeters, flight and bank indicators, oil gauges, compasses, and instruments of all types at less than one-third list prices.

100 Genuine German ZH6 Bosch magnetos, brand new $25

100 Berling magnetos $35

100 Dixie 800 magnetos.....$35

Berling armature assemblies.....$10

New Bosch armature assemblies.....$7

Booster magnetos $25

$20,000 stock of Dixie, Bosch, Berling, Victrix and other magneto parts at reduced prices.

200 Zenith carburetors, from 1" to 2¾"....$5 to $35

200 Miller carburetors, 1¾", in original cartons..$15

50,000 Spark plugs: AC, Rajah, Bethlehem, Splitdorf, Oleo, 30c each or $25 per hundred.

B.G., Mosler and other high grade spark plugs, slightly used, guaranteed, each.....75c

100 Liberty motors from $250 to $650 each. Brand new latest type Liberty motors with spare parts included, each.....$1000

New Le Rhone motors with propeller, each....$125

50 Hisso motors, model A, from.....$450 to $600

Hisso motors, model A with E connecting rods, cylinder blocks and pistons, each.....$700

Hisso motors, Model E or I, each.....$800

Brand new Hall-Scott motors, in the original crates, each $175

K-6 motors, each $550

New 16 cylinder, 550 H.P. Bugatti motors, each $500

Six cylinder Isotta Fraschini and six cylinder Hawk model Rolls-Royce motors, each.....$450

800 Brand new Liberty cylinder assemblies, each $50

Slightly used Liberty cylinder assemblies from $10 to $25 each.

50 Brand new Liberty crank shafts, each.....$150

Slightly used Liberty crank shafts, each.....$50

500 Liberty pistons, high and low compression, each $5

Parts for all types of airplane motors, including Whirlwind, at reduced prices. D.H. and Jenny axles, wheels, tires, tubes, bushings, hub caps, airplane fabric, tape, dope, needles, thread, nails, etc., at reduced prices.

OX5 pistons, standard or oversize, high or low compression, each.....$3.50

OX5 wrist pins, 25c; lock screws, 5c; piston rings, 15c; exhaust and intake valves, 60c; set of sixteen exhaust and intake gaskets, 75c; water outlet pipes, $3.50 each; Hub pullers, hub wrenches, rocker arms and all OX5 and OXX6 motor parts at reduced prices.

New Jenny radiators, each $30

Slightly used Jenny radiators, each.....$20

D.H. radiators, Spad, Fokker, Hall-Scott, and all types and sizes of radiators at low prices.

50,000 Turnbuckles, Government specification, 15c to 50c each.

20,000 bolts and nuts, Government specification, at reduced prices.

Nicholsons bastard wood working files, original cost, $1; our price 25c

200 French safety belts, finest quality of linen with swivel joints, each.....$5

Searchlights, generating plants, dollies, and field equipment of all kinds. Two German Pfaltz airplanes, complete with 240 H.P. Mercedes motors at, each $2500

Our own helmets, nothing better made, unlined, $3.50; kid lined, $5. They are equal to any $10 helmet made.

200 Map cases, roller type, detachable, 7" x 9", regular price, $12; our price.....$3.50

800 Propellers for Le Rhone, OX5, OXX6, Hall-Scott, Hisso, Liberty, and various other types, from $5 to $40.

100 Hall-Scott hubs, complete with bolts.....$5

100 New Jenny nose plates, each.....$1.50

100—900 x 200 wheels, tires, tubes, slightly used, $50 per pair; net, $75. All sizes and types of wheels at reduced prices.

Special for new manufacturers:

Hubs, wheels, primers, dash lights, eye bolts, aileron hinges, cane seats, 8V generators and propellers.

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KINNER ENGINE PRODUCTION PLANS

WITH the adoption of their definite 1929 sales and production policy, the board of directors of the Kinner Airplane and Motor Corporation, Glendale, has determined to accept manufacturers' quantity delivery orders during the first two weeks of September for shipment in 1929. The Kinner Company will sign production contracts at its factory and at the Aeronautical Exposition in Los Angeles, according to Francis Brunner, assistant general manager. Motor output for next year will be outlined accordingly.

Remarkable performances have been turned in by light commercial ships installing the Kinner power plant this year. The light weight of the Kinner, 260 pounds, combined with a power output that reached as high as 113.2 horsepower at the Bureau of Standards' fifty-hour test, are the features to which are attributed the speed and climb of Kinner-motored planes.

The Activian, a three-place cabin monoplane, with the new Gottingen wing, flew 1,122 miles in ten hours and fifty minutes, part of the time in a blinding snow and rainstorm at 9,500 feet over the notoriously dangerous Siskiyou Mountains of Northern California, in March. A Kinner engine replaced another radial in this ship, with which it was able to attain only 2,200 feet altitude.

The Simplex Red Arrow monoplane, using the Kinner as standard equipment, reports a guaranteed high speed of 120 miles per hour. The performance of this plane, piloted by Dick Myhres and Percy Smith, Southern California distributors, on a recent tour of the eastern states created a most favorable impression.

The Kinner Airster biplane, now manufactured by the Crown Airplane Company of Los Angeles under Kinner rights, has demonstrated the quickest take-off of any plane ever manufactured, according to Robert Starkey, veteran pilot of the Hollywood Air Transport.

The Taylor Brothers Chummy monoplane, now using the Kinner engine, and the Wallace Touroplane, another Kinner-powered plane, report highly improved performance.

Newest installations of the Kinner motor are being made in the Mohawk Pinto, the Wade biplane, the California Institute of Technology Stagger-Decalage biplane, the Nicholas-Beazley planes, the Kinner monoplanes, the Bolte Aircraft ships, and the Hardgrave planes. All of these plan to be under quantity production in 1929.

Since completing the Department of Commerce test at Washington, D. C., and receiving Approved Type Engine Certificate No. 3, the Kinner engine has been in demand from the builders of licensed ships, and this demand is expected greatly to multiply the output of the Kinner factory for next year. At present, the plant is putting out about a motor per day. Each motor is completely block tested from seven to ten hours before being shipped.

LINDBERGH FIELD, SAN DIEGO, DEDICATED

A MASS flight of approximately 400 army, navy and marine corps planes celebrated the dedication of Lindbergh Field, San Diego's municipal airport and commemorated the 25th anniversary of successful heavier-than-air flight.

The program of events for the two-day celebration, August 16 and 17, which thrilled thousands of spectators, included besides the formal dedication of Lindbergh Field and the mass flight, the following events: triple parachute jump; exhibition of combat flying by the "Three Sea Hawks" of the aircraft squadrons, battle fleet—Lieuts. D. W. Tomlinson, W. D. Davis and A. P. Storrs; exhibition of combat flying by the "Three Musketeers of the Air"—Lieuts. J. J. Williams, W. L. Cornelius and I. A. Woodring of the 95th Pursuit Squadron, Army Air Corps; smoke screen laying; formation flying; and exhibitions of commercial aircraft and passenger flights at the Barnett Avenue Airport, opposite the U. S. Marine Base.

SALE OF ENGINES

FIFTY-FOUR high-compression Liberty engines will be sold to the highest bidder at the Naval Aircraft Station, North Island, San Diego, Calif. Bids will open at 10 a. m. September 11. All material may be inspected at the station and copies of schedules of sales obtained on request from the supply officer at the station.

A NEW CATALOGUE

fully describing the Axelson Airplane Motor is now ready for distribution. Send for it.

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OREGON AIR NEWS

By C. K. Logan

EIGHTY-EIGHT acres at the edge of the city limits north of Corvallis and within a few hundred feet of the Pacific Highway will be leased by the chamber of commerce of that city until a two-year option is exercised for the acquisition of a permanent airport. Air cones will be erected at once and other markers placed. Sheds and hangars will be erected by volunteer labor furnished by the American Legion and the Corvallis service clubs which are planning a big barbecue. Runways will be long enough for a ship to take off with a 1000-foot run.

DEDICATION of the Vernonia airport was observed during July with ships from the Valley Air Service at Forest Grove and the Rankin Flying Service and McKenzie-Morrow Service, of Portland, participating in addition to several privately-owned airplanes.

CONSTRUCTION of a sport training monoplane of low wing design to be powered with a 70 h.p. Velie radial motor is under way at the Pacific Airplane Service hangars in Salem by Lee Eyerly. The ship will have a wing spread of 33 feet and a length of 20 feet. Framework is of half-inch steel tubing. Passenger and pilot will sit side by side with dual control.

WITH the establishment of a complete weather bureau at Salem, fliers along the Pacific Coast in Oregon will be supplied with local conditions before taking off. New instruments have been supplied the Pacific Airplane Service, Salem, Eugene airport and the municipal field at Medford in southern Oregon.

THE Hobi Airways, Aberdeen, Wash., has requested the Eugene city council for exclusive rights for local freight and passenger airplane service for a period of five years. Under the proposal the city would receive 5 per cent of the receipts for passengers and freight and 2 per cent for gasoline sold.

HILLSBORO will soon offer an airport owned by Dr. E. H. Smith, who has purchased a 100-acre tract. The airport will have one 3000-foot runway and one 2500-foot runway. Dr. Smith, who recently purchased a 110 h.p. Air King, expects to start a flying school with Charles Langmack, of Lebanon, in charge.

WHETHER or not a city can legally authorize the sale of bonds provided at special elections for the creation of an airport is undergoing a legal test in Oregon with Salem holding back construction of its $50,000 airport until the case of Roseburg, which voted a $25,000 bond issue for a similar purpose, can be determined in the courts.

Columbia Gorge Air Service

THE Columbia Gorge Air Service, Inc., is located on one of the most beautiful sites in the entire West. The airport, with accommodations for both landplanes and seaplanes, is at the junction of the Columbia and Willamette rivers. It is a part of the City of Portland, fronting on the Columbia River, within the boundaries of Jantzen Beach Park. The company offers scenic trips via landplane or seaplane up the Columbia River and to any part of the Northwest.

The company is also prepared to give instruction in flying and hopes in the future to manufacture planes. James Rinehart is the manager and chief pilot.

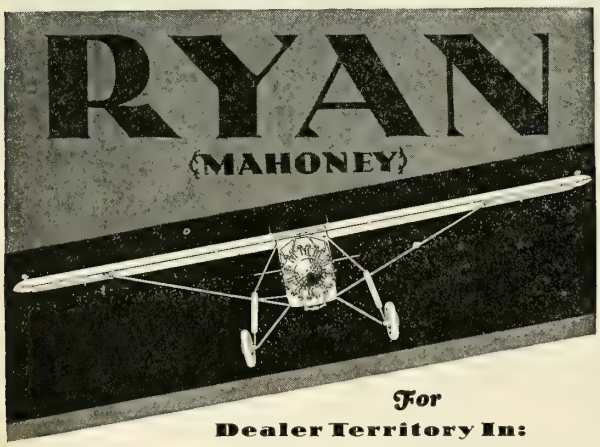
SPOKANE AIR NEWS

CONSTRUCTION of a four-plane hangar has been started at Felts Field, Spokane's municipal airport, by H. William Johnson and Lieutenant Ed. Bigelow, Opportunity residents. The men have purchased an Eaglerock plane, will establish a flying school and also take on the agency for a commercial airplane.

DAILY air passenger service from Spokane-to-Lewiston-to-WallaWalla-to-Spokane has been started by the Spokane Airways. Lieutenant Bill Williams, vice president of the company, is pilot on the route and Captain Tom Symons is flying instructor for the aviation school which the company is operating.

THE Universal Auto Company, one of Spokane's Ford distributors, is the first Spokane automobile firm to branch out and add airplanes to the products handled. The company will handle Ford planes.

CHARLES HEDGER has been named as airport manager for Felts Field, Spokane. The rules as laid down by the State of Washington Airport Association will be adopted.



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Streamline design . . . lets the wind go by.

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COLORADO AIR RODEO

SIXTY pilots and planes participated in the Air Rodeo, August 10, 11 and 12, sponsored by the Pikes Peak Aeronautique, Inc. Many types of commercial and army planes were represented—Curtiss Falcon and Hawk, Lincoln, DeHavilland, Ryan, Cessna, Thomas-Morse, Eaglerock, Ford, Laird, Waco, Travel Air, Swallow, Douglas O-2-H.

The On-to-Colorado Springs race was won by Vance Breese. Flying his Ryan Brougham from Detroit, Mich., with a load of four passengers, he made the 1150-mile trip in 13 hours, and scored a total of 262.05 points. E. J. Peters of Cleveland, Ohio, flying a Laird commercial Curtiss C-6 engine, carrying one passenger, was second with a total of 259.85 points.

In the August 10th events, Ben O. Howard, Colorado Springs, in a Menasco-motored Eaglerock, won in the balloon bursting contest; R. J. McNown, Wausau, Wisc., in an OX5 Eaglerock, placed second. Errett Williams, Greenville, S. C., in an OX5 Eaglerock, came within 6 feet 11 inches of the peg in the spot landing event. E. B. Todd, Douglas, Wyo., Ben O. Howard and C. P. Clevenger, all flying Eaglerocks, placed second, third and fourth respectively. Thirty planes were entered in these events.

R. J. McNown in an Eaglerock won the fifteen mile speed race for the Alexander trophy. Major D. P. Wardwell of the Powder River Flyers and Errett Williams, flying Eaglerocks, and Carl Winstead of Wichita, Kans., in a Travel Air, all tied for second place.

Saturday morning was open house at the Alexander factory. Visiting pilots toured the Eaglerock plant and airport. Powder River Flyers, led by Major D. P. Wardwell featured both morning and evening sessions with sky writing, day and night fire works, parachute jumping and combat flying. Twenty-two army planes, flying in fighting formation put on a mimic war exhibition and formation flying.

The new airport at Colorado Springs was formally opened Saturday afternoon. Judge Samuel H. Kingsley made the principal address in the absence of Mayor Victor W. Hungerford of Colorado Springs. During the dedication exercises the army fliers from Kelly Field, under the command of Maj. Clarence Tinker; the Dodd field airmen, under Capt. Reynolds; the Colorado National Guard contingent, under Lieut. Danny Kearns, and the March field group under Lieut. E. G. Harper, attended in a body.

Sunday the army fliers again thrilled the crowds with their spectacular stunt flying. I. M. McConnaughey, flying a Whirlwind powered Travel Air biplane belonging to T. A. Wells, won the free-for-all for speed. In the altitude race the same Travel Air plane, but piloted by Wells, took first. R. E. Edgar won third place in a Whirlwind powered Travel Air biplane. The OX5 races also went to Travel Air, Carl Winstead of Wichita driving this plane to victory in the speed altitude races.

ARIZONA AIR NEWS

By Al Wein

ARIZONA now has a state aviation committee, appointed by Governor George W. P. Hunt, and which at its initial meeting on August 1 at Phoenix elected Kirk T. Moore, of Tucson, chairman. John Girand, of Phoenix, was elected secretary.

THE Carson Flying School, the third of its kind in Phoenix, opened for business at the Phoenix municipal airport on August 5. Carson, who is Arizona distributor for the American Eagle, will manage the school and do commercial flying, while Bill Langdon will be in charge of the instruction work.

THREE Arizona cities, Phoenix, Tucson, and Douglas, will be on the new Los Angeles-Dallas airline planned by the Aero Corporation of California and the Standard Airlines, Inc., according to Jack Frye, president.

At present the Aero Corporation is operating a tri-weekly service from Los Angeles to Phoenix and Tucson. The Standard Airlines will be merged to provide the new service which will be inaugurated on November 1.

Frye also has plans for a feeder line from the Arizona cities to the West Coast of Mexico. Eight-passenger Fokkers, powered with 525 h.p. Hornets will be used in the service.

AN aviation school at Tucson, in which courses in aeronautics, meteorology and navigation will be given, is scheduled to be opened at the Davis-Monthan field on September 1 by the Southwest Air Service.

The officers of the new company are C. B. Cosgrove and H. W. Durham. The equipment of the Southwest Air Service will include a hangar on the field, three Siemens powered Travel Airs for student instruction, one Whirlwind powered Travel Air and one OX Travel Air.

CLIFTON is making extension improvements to its landing field and will soon have one of the best airports in the state.

AN appropriation of $16,500 was made recently by the Cochise County board of supervisors toward the establishment of airports at Douglas, Bissbe, Willcox and Tombstone.

THE Graham County chamber of commerce will be represented in the national air race from New York to Los Angeles by Charles Mayse, Tucson aviator. Mayse will fly a Waco plane owned by Ernest F. Wickersham of Safford.

APPROXIMATELY 850 passengers have been carried by the Scenic Airways, Inc., operating a scenic trip over the Grand Canyon. Trimotored Fords are used by the company.

HANGARS will be installed at the Ernest A. Love Airport at Prescott if the civic organizations of Prescott have anything to say about it. The organizations are planning a drive to raise funds to purchase the equipment for the field.

THREE Phoenix airports, the Van Buren field, municipal field, and the Phoenix commercial airport, are listed in the new Standard Oil directory of western landing fields.

GLOBE will soon have a modern airport. The business men of that city have appointed a committee to survey all the available sites. At present there is a landing field midway between Globe and Miami, but it seems to be far from satisfactory.

ED KOEHLER, Nogales flier, is going ahead with his plans for a line from Nogales to the fertile west coast of Mexico. He has already received permission from the governor of Sonora, Mexico.

EVERETT NEWCOMER, who took all the photos on the *Arizona Republican's* aerial survey of the state, has opened an office in Phoenix and will specialize in aerial photography.

UTAH AIR NEWS

By Glen Perrins

THE Western States Aero Corporation has leased a tract of land near Beck's hot springs and the Salt Lake Gun Club, and will erect hangars. A flying school, freight and passenger service will be offered. Richard L. Strong, of Los Angeles, is president of the newly organized corporation.

THE extension of the Varney airline for the carrying of passengers between Salt Lake, Seattle and Portland, is being planned. The company now operates a mail route between Salt Lake and Pasco, Wash.

THE Reserve training camp was held at Salt Lake City for two weeks during August, organized reserve corps coming from Montana, Idaho, Nevada and various parts of Utah.

THE distinguished flying cross, awarded him by Congress for his famous "dawn-to-dusk flight", June 23, 1924, has been received by Lieutenant Russell L. Maughan in Salt Lake, where he is now in charge of the air squadron of the 104th division of the Army Air Corps.

ROYALTY has taken to riding the air mail. Twenty-five queens were passengers on the Boeing air mail plane from Modena, Ohio, to Bakersfield, California, recently. Their passage was $10.40—they were queen bees.

Also traveling in the style of true royalty were eight queen bees from Queen Bee company, Jessop, Ga., en route by air to F. L. Putney, of Hope, Idaho.

AN additional 150 feet of ground has been leased to extend the frontage of Salt Lake's airport. The Boeing Air Transport company plans to build a new hangar on the property to take care of its new transport planes, which will be put into service soon.

(*Continued on next page*)

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(Utah Air News continued)

A FLYING FESTIVAL was celebrated at Logan, Utah, on Pioneer Day, July 24th, the day when the Mormons first entered Utah in 1847 and which is celebrated each year.

AN airplane service between Ogden and Chicago, and Ogden and the Grand Canyon of the Colorado with stops at intermediate points between Ogden and the Grand Canyon, is being inaugurated for summer months, according to A. Smith Nelson, vice president and manager of the Scenic Airways.

THE new air mail line between Salt Lake and Great Falls, Montana, opened August 1. The planes stop at Ogden, Pocatello, Butte, Helena, and Great Falls, leaving Salt Lake at 10:20 a. m. and arriving at the final stop at 4:30 p. m.

SIX new airplane emergency landing fields in Utah have been provided for. They are in Beaver and Iron counties, one of them near the station of Iaho, another near Thermo, a third near Mada, while the others are in the vicinity of Avon and Lund.

These emergency fields are in line northeast and southwest and are destined to be a part of the safety chain from Los Angeles to Salt Lake. The fields follow in a general way the Union Pacific railroad. They will soon be placed in condition for emergency use by airmen.

HONOLULU AIR NEWS

By Verne Hinkley

THE first indication observed here of the expansion program for the Army Air Corps is at Luke Field where work is under way on the construction of a 1500-foot runway down the center of Ford Island, on which the station is situated. This is taken as an indication that the army will not abandon Ford Island in the near future.

The grading has been completed and work has been started on the installation of an underground sprinkler system and on the sodding of the area. The runway should be in use within the next two months.

A number of improvements, particularly in buildings for the housing of the personnel, are contemplated for Wheeler Field, at Schofield Barracks, but so far none of the work has been commenced.

FIVE Hawaiian department Air Corps officers who participated in the annual machine gun and bombing matches at Langley Field recently, returned on the transport *Cambrai* late in July. They were First Lieutenants Homer W. Ferguson, J. H. Hicks, J. H. Morris, J. C. Schively and Second Lieutenant Gilbert L. Tefft. First Lieutenant L. A. Smith, also a member of the Hawaiian department team, will return in September after having enjoyed a 30-day leave of absence on the mainland.

MUCH favorable comment is being heard here on the radio record which the Maitland-Hegenberger trimotor Fokker monoplane is setting on its various cruises between the islands. The outstanding feature of a recent trip to the island of Kauai was the ease with which the ship maintained radio communication at all times with WYQ, the army control station.

CONTRARY to reports in circulation here since his injury at Hilo a few weeks ago Captain Lowell Smith, last of the round-the-world fliers to remain in the army, has no intention of quitting the Air Corps.

Captain Smith suffered the loss of a small portion of the middle finger of his right hand when he accidentally got the member in the way of a whirling propeller.

LIEUT. COMDR. C. T. GLADDEN has arrived to become the assistant commandant of the naval air station at Pearl Harbor. His senior is Comdr. Victor D. Herbster, who returned recently from a trip, on leave, to the coast.

MACWHYTE TIE RODS ON AIR TOUR WINNERS

THE first seven places in the National Air tour were won by planes equipped with Macwhyte streamline or round tie rods.

Experience demonstrates that planes gain 10% or more in flying efficiency when rigged with streamline tie rods. Macwhyte streamline tie rods reduce the wind resistance to the minimum.

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A small, roomy, two-place, high wing, cabin or open cockpit monoplane, ideal for sport or student instruction.
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OX5 valves, 55c; OX5 pistons, $19.50 set; seven cyl. Bosch mags., $45 ea.; OX5 cyls., like new, $17.50. New Simms L8 mags. for Hisso, lots six only at $19.50 ea.; Berling condensers, lots six, $3.50 each; Berling terminals No. 1 to 8, $4 set. Overhauled Berling & Dixie 800 mags., $40 ea.; new production OX5 ignition wire and tube assemblies with all terminals, both sides for $6.50. Qt. size brass "Fyr-Fyter" fire extinquishers, $50 doz. Berkshire OX5 mags., $12.50 ea.; platinum points for Berling, lots six pair, $3.85 set. OX5 No. K-291 mag. drive, ball bearing, lots six, $1.25 ea. Carb. jet wrenches, 35c; Berling socket wrenches, 75c. Wheel spokes (new prod.), 25c; Fahrenheits, $4.50; oil guages, 60 and 120 lb., $1.50; dozen lots, $85c; new Hisso "E" Banks, $100; new Hisso Zenith carbs., $50; new Hisso "A" rods, $12.50. Send name for mailing list.

OX5 Valve Seat Reamers, $20 per set.
Valva Guide Reamers, standard or oversize, $2.50 each.

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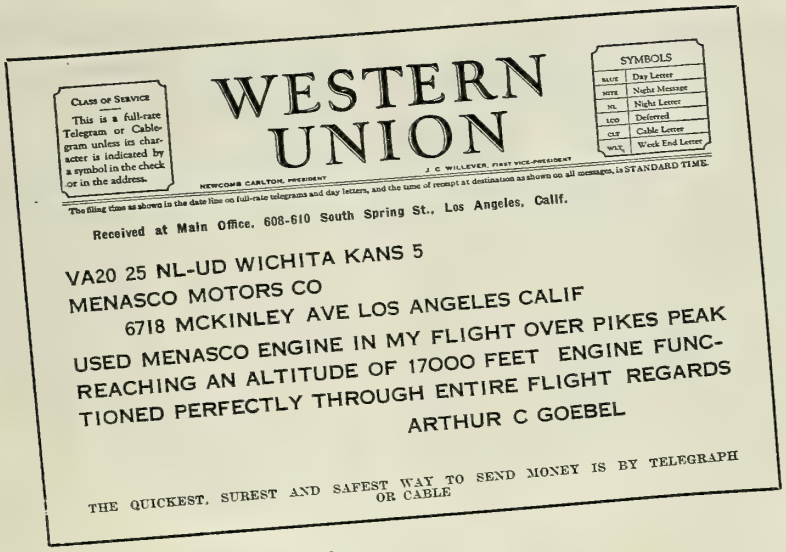
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NEWS OF THE AIR SERVICES

MD. N. G. SUMMER CAMP.

THE 104th Observation Squadron, 29th Division, U.S.A.C. Maryland National Guard, located at Logan Field, Baltimore, Md., encamped at Shepherd Field, Martinsburg, W. Va., for two weeks during August.

The officers at the camp were: Major W. D. Tipton, commander; Major Paul Burwell, former commander; Capt. Charles Masson, flight commander; Capt. Townsend Scott, adjutant; Capt. George Cobb, operations officer; Capt. H. R. Bohlman, photographic officer; Capt. F. L. Detrick, flight surgeon; Capt. James Hooper; Capt. P. H. Hamlin; Lieut. Charles Y. Banfill, U.S.A.C., instructor; Lieut. George Rogers, supply officer; Lieut. Robert Stewart, engineering officer; Lieut. Carroll Gorman, mess officer; Lieut. George M. Hanna, radio officer; Lieut. O. W. Snyder, Department of Commerce airway inspector; Lieut. W. G. McEvoy; Lieut. J. Pat Travers; Lieut. Lee H. Dice; Lieut. David R. McCauley; Lieut. Ross Cameron; Lieut. Lewis S. White; Lieut. Tilson Mudge; Lieut. J. F. Meehan, 305th Cavalry on detached duty with this outfit; Lieut. James Whitescarver; Lieut. Lyman Patterson; warrant officer B. H. Mills, in charge of radio equipment from Bolling Field. There were 123 enlisted men in camp besides the above mentioned officers.

The Berkeley Aviation Club of Martinsburg, had drilled an artesian well at Shepherd Field, which supplied the camp with water. The field now has a north and south runway of 3000 feet and was put in excellent condition by the club prior to the arrival of the encampment. An aerial circus was put on by the National Guard and many social functions were given in honor of the guardsmen.

All theatres, all league baseball games and amusement parks were free to the visiting officers and men during their stay in the city.

WASHINGTON - NEW YORK IN 70 MINUTES

LIEUTS. FORD J. LAUER and Gordon P. Saville, Army Air Corps fliers stationed at Mitchel Field, established a new speed record between Bolling Field, Washington, D. C., and Mitchel Field, New York. They covered the 240 miles in one hour and ten minutes flying two Curtiss O-1 Army Observation planes. The pilots were returning to their station at Mitchel Field after bringing two visiting English airmen, Squadron Leader A. S. J. Lee and Flight Lieut. E. J. Kinson McCloughry, of the British Staff College to Washington and were not trying to break any records. They ran into a strong favoring wind at about 2,000 feet.

NAVY AIRSHIP BIDS

TEN bids, including three from Germany, for the design and construction of two rigid airships of 6,000,000 cubic feet capacity were received by the Navy Department on August 10.

The German bids were for designs only and were made by Max Kastner of Apolda, Gustav Wilhelm Hagermann of Cschatz and Schutte & Co., of Berlin.

Of the American offers one for design, or for design and construction, was from the American Brown Boverie Electric Corporation of Camden, N. J.

Three were for design and construction, being received from the Goodyear Zeppelin Company of Akron, Ohio; Geiser & Seth of Chicago and the Trent Engineering and Manufacturing Company of Los Angeles.

Two were for design only, being received from Albrecht Luck of 524 Wales Avenue, New York City, and E. Pollok of 171 Reid Avenue, Brooklyn, N. Y.

The board which will pass on the designs consists of Rear Admiral W. A. Moffett, senior member, Comdr. S. M. Kraus, Lt. Comdr. C. H. Havill, Lt. T. G. W. Settle and Lt. G. W. Whittle.

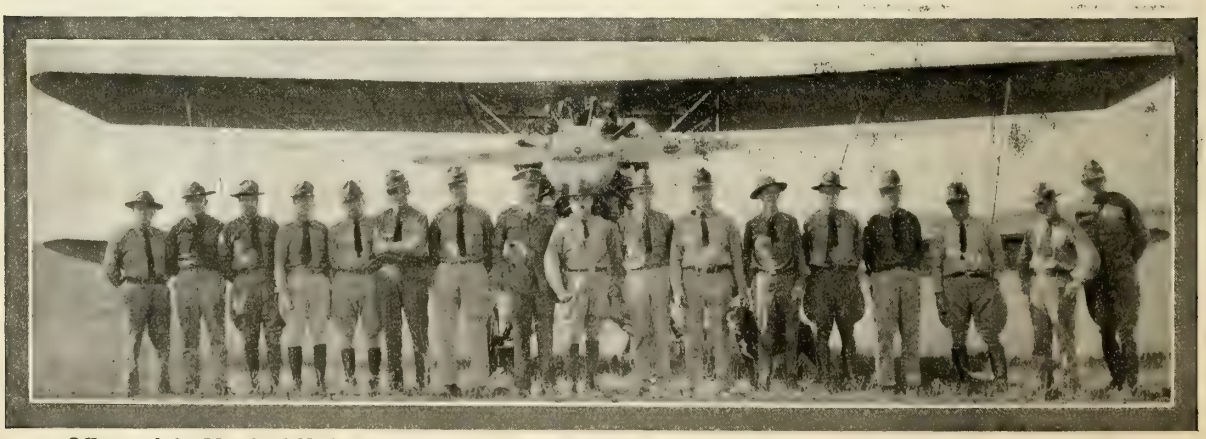
MACREADY GETS D. S. C.

LIEUTENANT J. A. MACREADY, former army pilot, was formally awarded the Distinguished Flying Cross at Wright Field on July 28. The citation accompanying the decoration mentions the record breaking non-stop flight from New York to San Diego on which Lt. Macready was accompanied by Lt. Oakley C. Kelly, and his establishment of an altitude record when he reached a height of more than 36,000 feet. Lt. Macready is now assistant to the chief engineer of the Frigidaire Corporation, Dayton, Ohio.

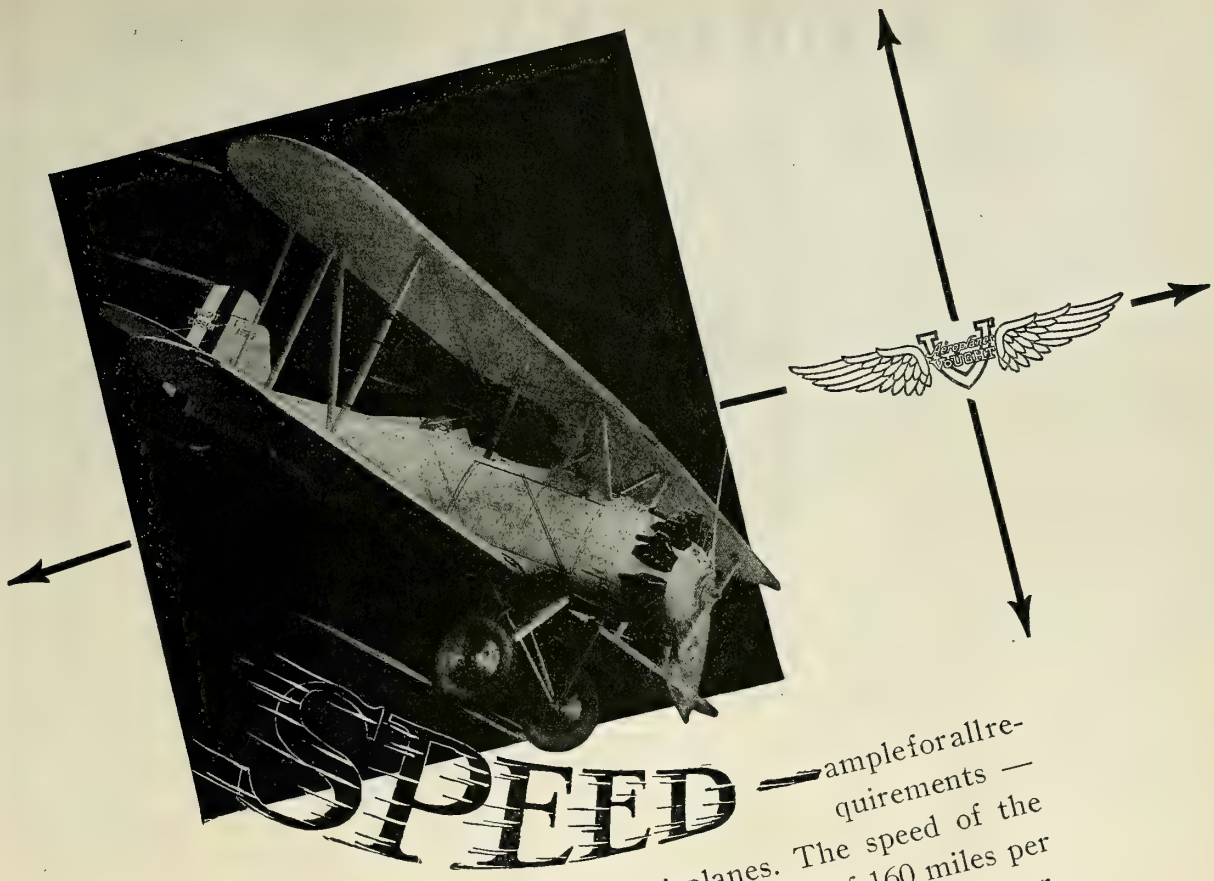
MARINE CORPS RESERVE TRAINING

MARINE CORPS Aviation has started a five-year program in connection with the training of students to qualify as Naval Aviators, and receive commissions as second lieutenants in the Marine Corps Reserve. Thirty-seven of these students will be trained this fiscal year and four Marine Corps Reserve Aviation Units have been established for this purpose. These units have been assigned to the following Naval Reserve Aviation Bases, and are commanded by the following officers: Captain Chester J. Peters, F.M.C.R., Great Lakes, Ill.; First Lieut. Benjamin Reisweber, F.M.C.R., and Second Lieut. Erwin G. Taylor, F.M.C.R., Rockaway Beach, Long Island; Second Lieut. George B. Stephens, F.M.C.R., Squantum, Mass.; Second Lieut. Livingston B. Steadman, F.M.C.R., Sand Point, Washington.

Upon completion of primary flight training at the above Naval Reserve Stations, the students will go to the Naval Air Station, Pensacola, Florida, for advanced training, upon the completion of which they will be designated Naval Aviators and, after examination, will be commissioned second lieutenants in the Marine Corps Reserve.



Officers of the Maryland National Guard at their summer camp at Martinsburg, W. Va. Major Tipton is in center.



SPEED — ample for all requirements — is embodied in all Vought Airplanes. The speed of the latest Vought, the "Corsair," is in excess of 160 miles per hour, and its cruising speed is 135 miles per hour. However, the other essentials of fine airplanes—climb, performance at altitude, controllability, adequate safety features, and long life—are not sacrificed in obtaining high speed. And low landing speed and a phenomenal speed range of over three has been designed into the Vought "Corsair."

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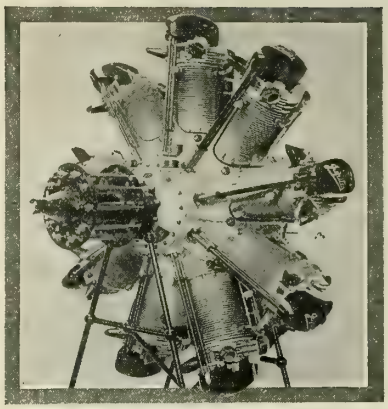
THE AERONAUTICAL INDUSTRY

THE ILLINOIS TO SWEDEN FLIGHT

ALTHOUGH their plane, the *Greater Rockford,* was damaged when it struck a knoll just after taking off July 25 on its flight to Sweden, Bert R. J. Hassell and Parker D. Cramer started again on the trip August 16. The route planned was to take the Stinson-Detroiter monoplane first to Cochrane, Ont., from which successive hops were to carry it to Mount Evans, Greenland; Iceland; and finally Stockholm, Sweden. The undertaking was backed as a community venture by the City of Rockford, Ill.

The first lap of the flight was completed after a little more than eight hours of flying. Because of heavy rains Hassell and Cramer were delayed two days in taking off on the second leg to Mount Evans. However, about noon August 18, the *Greater Rockford* took off at Cochrane and headed for Greenland. For some time radio communications were maintained between civilization and the monoplane which was blazing a new air trail across the top of the world. The last message came through on the morning of August 19 from a point off Cape Chidley while the plane was flying over Davis Strait. Since that time the fliers have not been heard from.

On the first leg of the trip, the *Greater Rockford* carried 250 gallons of gasoline and 20 gallons of oil. Fully loaded it weighed about 5,000 pounds. It had a wing spread of 46 feet.



The Bristol "Jupiter" engine

E. W. BLISS CO. TO MFG. BRISTOL "JUPITERS"

E. W. BLISS CO. has been appointed exclusive manufacturers and distributors for Bristol aero engines in the United States.

The Bristol Airplane Co. are pioneers in the development of static radial air-cooled type airplane motors, and their "Jupiter" engine, which will be manufactured by the Bliss Co., is considered one of the most highly perfected motors of this type made. It has been widely adopted by leading European countries for use on the principal air transport lines.

The essential construction of the "Jupiter" motor incorporates a number of exclusive features. It is a light weight engine of 9 cylinders, with a bore of 5.75 inches, stroke of 7.5 inches, developing 477 h.p. at 1700 r.p.m. and 520 h.p. at 1870 r.p.m. at ground level. It has had a wide application for commercial air transport because of these features, enabling it to carry a heavier payload in proportion to its size, together with an economy of fuel consumption and its mechanical simplicity and long life.

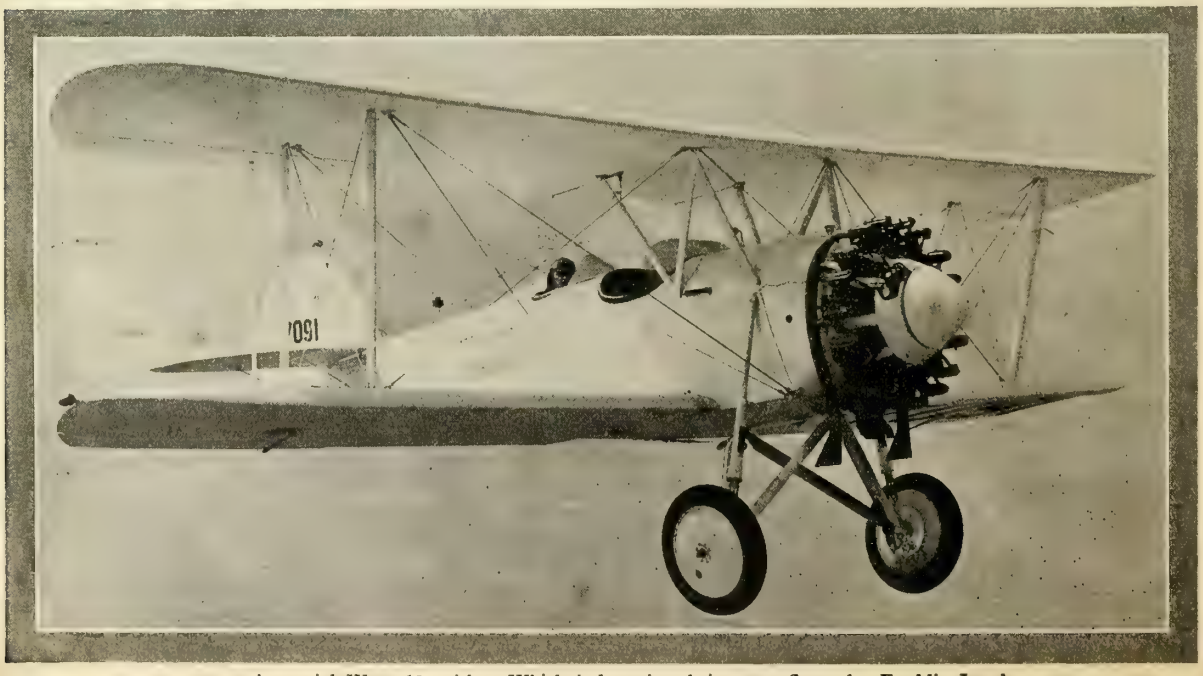
E. W. Bliss Co. is one of the oldest American manufacturers of heavy machinery and presses, and has been established for over 75 years. The company operates plants in Brooklyn, New York, Hastings, Michigan, Salem and Cleveland, Ohio, Paris and London, and has an extensive export business.

A SPECIAL WACO-10

ONE of the large number of Whirlwind-motored Wacos sold for pleasure and sport is shown below. It is a special Waco-10, taken while it was being test flown by Freddie Lund, one of the Advance Aircraft Company's test pilots.

This ship was built to the order of Mr. T. Higbee Embry, of Cincinnati, Ohio, and includes a most complete instrument panel, carrying the following items: rate of climb indicator, earth inductor compass, air speed indicator, bank and turn indicator, magnetic compass, navigation lights, two parachute flares, instrument board gas gauge and clock.

It is fitted with Standard Steel propeller, Aerol struts and Bendix brakes, and finished in pure white throughout.



A special Waco-10, with a Whirlwind engine, being test flown by Freddie Lund

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IN THE 1928 NATIONA

THE STINSON JUNIOR



The Stinson Junior is a thoroughly reliable and beautifully upholstered four-place cabin monoplane. It combines every factor that makes for satisfactory private or commercial operation—high performance, ample speed, passenger comfort, operating economy, high payload, and for those who demand it, ability to get in and out of small landing fields. Standard equipment includes the oleo and spring landing gear, hydraulic tail wheel, brakes, cabin heaters and dual control. The Stinson Junior is priced at $6,750

Stinson planes finished third, fifth and sixth in the National Reliability Air Tour of 1928, beating by a wide margin *all* other single motored cabin planes.

Note the exceptionally high performance record of the Stinson Junior. Powered with the Warner Scarab 120 h. p. Engine and carrying a useful load of 993 pounds, the Stinson Junior consistently led and finished the Tour far ahead of *all* single motored cabin planes.

The Stinson Junior, received with unbounded enthusiasm at the All American Aircraft Show, was the outstanding plane in the National Reliability Air Tour of 1928 because of its beautiful appearance and design, and because of its efficiency and performance.

The Junior flew with wide open throttle for 95 hours at 2000 r. p. m. over the excessively hot regions of Texas, New Mexico, Arizona and over the mountain ranges and in the high altitude areas of the Northwest. Always carrying the maximum useful load the Stinson Junior gave 100% performance and reached altitudes of 12,500 feet without difficulty.

Such outstanding performance was secured at an extremely low cost. At full throttle for 95 hours the average gasoline consumption was 8 gallons per hour. During one period of 8 hours' flight, the oil consumption was only one quart.

The Stinson Junior has emphatically demonstrated its ability to give every aircraft buyer the fullest measure of efficiency, performance and economy such as Stinson planes have always given.

The Stinson-Detroiter six-passenger cabin plane, the leader of last year's Reliability Tour, carried a useful

The official Tour results printed belo are of vital importance to the prospecti purchaser. Quite frequently it is difficu for the intending buyer to obtain accura information about speed, load carryi ability, take-off and landing time of va

Official Rating and Scores

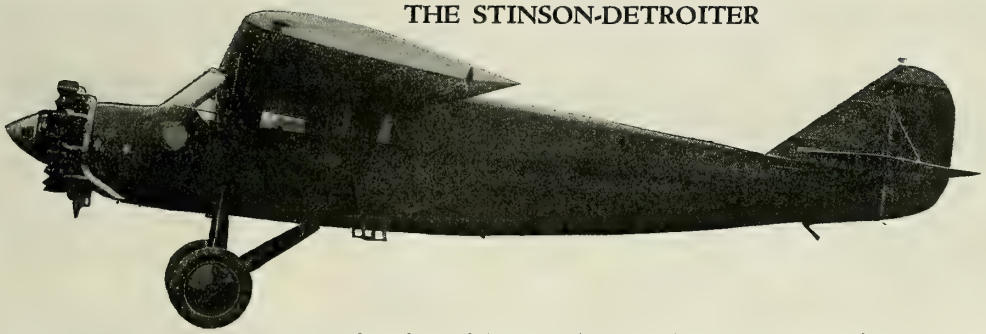
	Plane and Order of Finish	Engine	Horsepo
1.	Waco-10	Whirlwind	220
2.	Ford	3 Whirlwinds	660
3.	**Stinson-Junior**	**Warner**	**120**
4.	Waco-10	Whirlwind	220
5.	**Stinson-Detroiter**	**Whirlwind**	**220**
6.	**Stinson-Detroiter**	**Whirlwind**	**220**
7.	Ryan	Whirlwind	220
8.	Bellanca	Whirlwind	220
9.	Ryan	Whirlwind	220
10.	Buhl	Whirlwind	220
11.	Lockheed	Whirlwind	220
12.	Fairchild	Whirlwind	220
13.	Travel Air	Caminez	140
14.	Bellanca	Whirlwind	220
20.	Ryan	Whirlwind	220
23.	Curtiss Robin	O X 5	90

STINSON AIRCRAFT CORPORATIO

ingle Motor Cabin Planes!

ELIABILITY AIR TOUR

THE STINSON-DETROITER



The Stinson-Detroiter six-place cabin monoplane, beautifully upholstered, is ideal for the business organization whose executives desire quick transportation to and between their branch offices, manufacturing units, sources of supply, etc. The Stinson-Detroiter is used on many established air lines carrying U. S. Mail, passengers and express every day. It is powered by the famous Wright engine and is equipped with oleo and spring landing gear, cabin heaters, brakes, steel propeller, dual control and starter. The price is $12,500

s airplanes. The National Reliability Air our provides this information. Compare inson with EVERY plane in the 1928 eliability Tour for speed with load, take-f with load, horse-power with load and st, but not least, the LOAD CARRIED.

1928 National Air Tour

Load Carried Pounds	High Speed With Load M. P. H.	Take-off Time With Load (seconds)	Landing Time With Load (seconds)	Points Earned
950	128.1	5.1	4.0	27013.4
3672	117.6	12.5	4.6	24390.8
993	**105.2**	**11.60**	**4.8**	**22786.5**
955	122.8	6.0	4.4	22127.1
2112	**120.5**	**14.4**	**9.6**	**21243.0**
2083	**117.0**	**16.2**	**7.2**	**19871.3**
1184	113.3	17.7	11.4	19728.9
1810	126.5	14.2	9.2	19445.3
1274	115.7	9.9	4.5	18389.3
1420	136.7	12.8	7.9	17948.1
1403	135.9	11.9	9.1	17596.6
1368	113.4	13.5	5.7	16974.5
783	94.0	10.3	5.4	15780.2
1778	124.0	14.8	14.2	15080.8
1310	117.6	11.4	5.1	8169.4
643	94.2	11.7	14.2	5949.9

load of 2112 pounds and finished well ahead of every single motor, Whirlwind cabin plane in the 1928 Reliability Tour.

Compare this record with the loads carried by other planes. Then compare the speed with which the Stinson-Detroiter carried its load against the speeds of other planes carrying *considerably lighter loads*. Note also the Stinson-Detroiter's remarkably fast take-off time with its load; in fact, the heavily laden Stinson-Detroiter got off faster than several planes carrying *far less* loads.

Do you demand planes that can and will fly with heavy payloads at high speeds at the lowest cost, that can take-off quickly and land slowly? The Stinson-Detroiter, as proved by the official results of the 1927 and 1928 Reliability Air Tours, most effectively combines these essential factors.

Remember the Stinson reputation, strengthened now more than ever by the 1928 Tour performance record, for its ability to take-off quicker, land slower, climb faster than any cabin plane with the same load, same power and under similar conditions.

As a service to the many business organizations and commercial operators who are considering the purchase of planes, we will gladly prepare operating surveys and cost per mile estimates. Let us prove that aircraft operation pays dividends.

Stinson offers to commercial operators tried and proven equipment capable of *more* revenue loads per mile at *lower* cost per mile. To private owners and to business organizations Stinson offers planes that are outstandingly efficient, reliable, dependable and economical.

• NORTHVILLE • MICHIGAN

Results of the National Air Tour

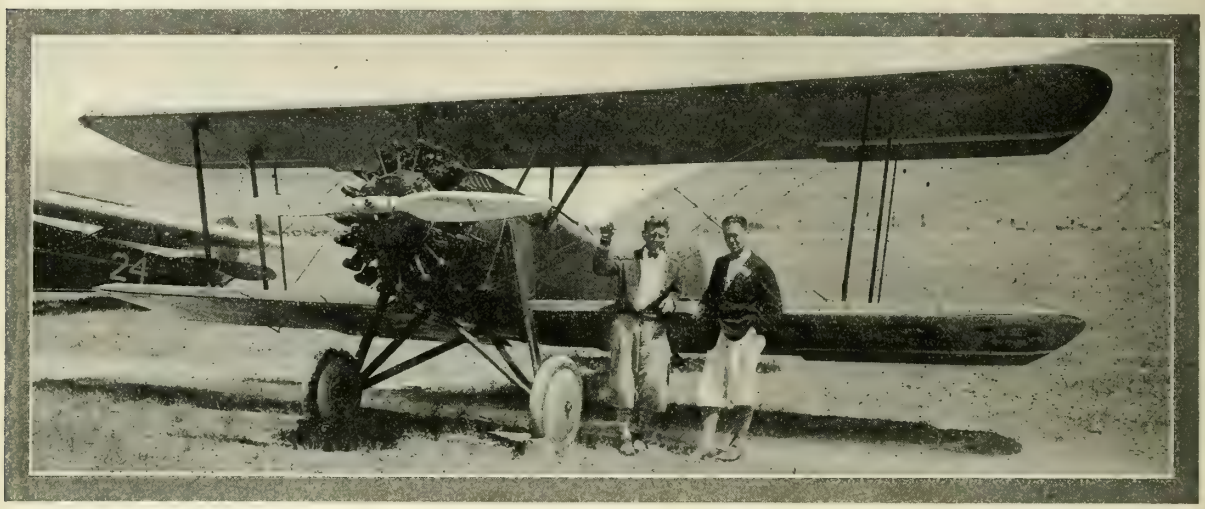
THE Edsel B. Ford trophy for the plane making the highest score of points on the National Air Tour of 1928 was won by pilot John Paul Wood in his Waco-10 biplane. The tour began at Ford Airport on June 30th and ended there on July 28th, covering 32 cities and an air line distance of about 6,000 miles.

The list below is the official report of the event, the last column showing the scores made by the 24 planes which finished. The order in which the planes finished is indicated in the next to the last column.

In order to be held permanently the trophy must be won three times by a single entry. Last year Eddie Stinson was the winner and the year before it was won by Walter Beech. Besides the trophy, cash prizes totalling $12,000 were awarded. Complete rules and regulations governing the tour were published in the June issue of AERO DIGEST; in the July and August issues the progress of the tour and illustrations of the planes and pilots were featured.

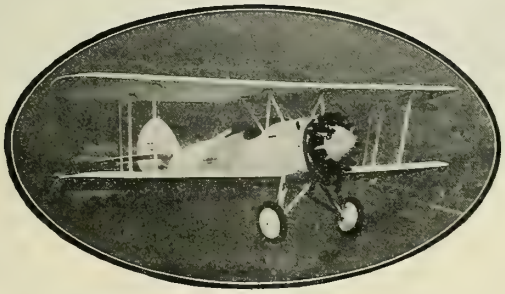
This year's tour was voted as the most successful from every standpoint. It showed the possibility of flying on schedule over difficult territory, by all types of planes, and with no serious accidents. The equipment was put to a most severe test, and the success of the pilots is a tribute to their skill.

(Continued on next page)



Frank Clewers and John P. Wood, winners of 1st place in the 1928 National Air Tour. Below—table of full results.

PLANE NUMBER	PLANE MODEL	DEPARTMENT OF COMMERCE AIRWORTHINESS CERTIFICATE NUMBER	MAKE OF ENGINE	NUMBER OF ENGINES	ENGINE DISPLACEMENT	NAME OF PILOT	DEPT. OF COMMERCE PILOT LICENSE NUMBER	WT OF PILOT IN LBS	MAX. LOAD ALLOWED BY DEPT OF COMMERCE	WEIGHT OF PLANE EMPTY	DEPT OF COMMERCE MAX USEFUL LOAD	75% OF TOTAL CONTEST LOAD	Best Stick Time	Best Unstick Time	Max. Speed M.P.H.	80% Max Speed Except Cat. Actions Restricted	Points for Perfect Performance Each Leg	Standing At Finish	Total Points
1	BELLANCA C.H.	6503	WRIGHT J5-CA	1	788	W.S. Brock	363	208.5	4050	2240	1810	1356	9.2	14.2	126.5	101.2	621.4	8	55.36.04 / 1944.3
2	FORD TRI MOTORED 4-AT	3443	WRIGHT J-5	3	2364 or 1576	F.M. Hawks	498	163	10,000	6328	3672	2754	4.6	12.5	117.6	94.0	798.3	2	64.05.42 / 24390.8
3	TRAVEL-AIR 8000	3562	FAIRCHILD CAMINEZ	1	447	J.N. Kelly	42	182	2,300	1517	783	587	5.4	10.3	94.0	75.2	522.0	13	75.12.41 / 15780.2
5	CURTISS-ROBIN	X5049	CURTISS OX-5	1	502	D.R. Robertson	342	120	2,180	1537	643	481	14.2	11.7	94.2	75.3	232.7	23	184.26.22 / 5949.9
6	STEARMAN C-3B	5084	WRIGHT J-5-AB	1	788	D.P. Levy		127	2650	1730	920		7.8	9.5	117.7	94.1	396.9	17	56.48.38 / 12700.8
7	BUHL-AIRSTER CA-3C.	NC5861	WRIGHT J-5	1	788	Alger Graham	989	158	3069	1950	1119	839	10.3	9.3	122.1	97.6	442.9	16	66.27.37 / 13528.2
8	BUHL-AIRSEDAN CA-3C.	NC5860	WRIGHT J-5	1	788	Louis Meister	16	161	3200	1780	1420	1065	7.9	12.8	136.7	109.3	592.4	10	17948.1
9	RYAN-BROUGHAM B-1	NC1159	WRIGHT J-5-C	1	788	E.W. Cleveland	1815	166	3300	2116	1184	888	11.4	17.7	113.3	90.6	292.5	20	75.36.41 / 8169.4
10	RYAN-BROUGHAM B-1	5547	WRIGHT J-5	1	788	Al. Henley	778	132	3300	2026	1274	955	4.5	9.9	115.7	92.5	646.8	7	70.22.56 / 19738.9
12	EAGLEROCK HISPANO	6505	HISPANO SUIZA E	1	718	C.P. Clevenger	141	155	2527	1800	727	545	5.4	9.7	113.2	90.5	380.0	18	65.48.07 / 11447.7
14	TRAVEL-AIR 9000	4739	SIEMENS HALSKE	1	517	G.B. Peck	Letter Of Authority	127	2300	1480	820	615	8.4	13.1	98.1	78.4	361.6	22	88.18.42 / 6715.4
16	RYAN-BROUGHAM B-1	5553	WRIGHT J-5	1	788	Vance Breese	1331	146	3300	1990	1310	963	5.1	11.4	117.6	94.4	592.4	9	59.00.42 / 10991.3
17	SWALLOW J-5	6097	WRIGHT J-5-AB	1	788	Jay Sadowsky Havana MV.	625 410	159	2700	1745	955	716	8.0	8.9	119.6	95.6	428.5	15	58.03.55 / 7964.6
18	WACO 10	5533	WRIGHT J-5	1	788	J.P. Wood		172	2600	1650	950	712	4.0	5.1	128.1	102.4	850.4	1	55.18.59 / 27015.4
19	WACO 10	6528	WRIGHT J-5	1	788	C.W. Meyers	1142	117	2600	1645	955	716	4.4	6.0	122.8	98.2	718.2	4	22187.1
20	STINSON-DETROITER S-M-1D	5900	WRIGHT J-5-1B	1	788	Ed. Stinson		153	4500	2388	2112	1584	9.6	14.4	120.5	96.4	673.1	5	57.23.68 / 21243.8
21	STINSON-DETROITER S-M-2	5889	WARNER	1	422	Randolph Page	806	140	2500	1507	993	744	4.8	11.6	105.2	84.1	752.8	3	69.29.10 / 22706.5
22	STINSON-DETROITER	6580	WRIGHT J-5	1	788	P.O. Lowers Bruce Braun		191	4500	2417	2083	1562	7.2	16.2	111.6	89.2	630.3	6	62.16.54 / 19871.3
23	LOCKHEED VEGA	4097	WRIGHT J-5C	1	788	R. Cantwell Lee Shoenhair	1466	155	3470	2067	1403	1052	9.1	11.9	135.9	108.7	575.2	11	52.18.29 / 17516.6
24	FAIRCHILD F-C-2	5574	WRIGHT J-6	1	788	R.W. Pears	189	131	3600	2232	1368	1026	5.7	13.5	113.4	90.7	512.6	12	61.49.86 / 15979.5
25	BELLANCA C.H.	4050	WRIGHT J-6-CA	1	788	G.W. Haldeman	222	135	4050	2272	1778	1333	14.2	14.8	124.0	99.2	482.2	14	55.23.21 / 15080.8
26	MONOCOUPE 2 PLACE	5878	VELIE N-5	1	250	P.F. Omlie	199	135	1175	840	335	251	13.7	9.6	88.4	70.7	2540	24	5523.0
28	WACO	X3132	FAIRCHILD CAMINEZ	1	447	M.G. Beard		166	2150	1455	695	521	13.3	8.4	90.1	72.0	321.6	21	278.56.09 / 7850.6
29	MONOCOUPE	5877	VELIE N-5	1	250	L.H. Atkinson		157	1175	825	372	279	10.2	7.4	86.9	69.5	367.3	19	237.07.58 / 8370.6



A Waco Ten with Special equipment built to the order of Mr. T. Higbee Embry of Cincinnati

WACO

won the National Air Tour by demonstration of the same quality of performance which has, in the last seven years, been responsible for WACO'S leading position in the industry.

Reasonably prompt deliveries can now be had with OX-5, Ryan-Siemens, Hisso and Wright motors. Type certificates 9, 13, 26, 41, 42.

WACO AIRPLANES

The Advance Aircraft Co., Troy, Ohio



Randolph Page and his Stinson plane won 3rd place in the National Air Tour. Ford monoplane (2nd place), F. M. Hawkes, pilot.

(*Continued from preceding page*)

Frank M. Hawkes won second place in the Ford trimotored monoplane; he carried several passengers throughout the journey. Third place was won by Randolph Page in a Stinson Detroiter Junior monoplane powered with the new Warner engine; the fine showing made by the low-powered Warner in competition with engines much longer in production, is a valuable demonstration of its high merit.

DETROIT AIR NEWS

By Frank Bogart

THE formation of a new aircraft company to build light cabin planes around motors ranging from 100 to 150 horsepower was among the outstanding August developments here. Alfred V. Verville, noted designer, expects in 90 days to have the first plane ready for testing. He will be secretary of the new concern, which has the backing financially of Walter O. Briggs, automobile body builder, and one of Detroit's most prominent motor and financial leaders. B. F. Everitt, veteran automobile builder, is president of the new firm, to be known as the Verville Aircraft Manufacturing Company, which has already taken over the plants of the old Rickenbacker Motor Car Company. James Goudie and Harry Griffiths are vice president and treasurer, respectively.

DETROIT is now producing an average of better than 50 airplanes monthly, with one a day as the figure at Stinson Aircraft; 18 to 20 a month, that of Buhl Aircraft; and two of the large Ford trimotors every week. The Stout Metal Airplane Company, division of Ford Motor Company, attained this basis shortly after August 1. Also the first of the all Wasp-engined Fords was turned out this past month and delivered to Col. Gould Dietz of Omaha; while two of the regular Whirlwind jobs were flown away by Major William B. Robertson of St. Louis and his associates for the opening of their St. Louis-Chicago passenger service.

IN 1922 Detroit first voted for a municipal airport. At the elections last fall a $2,000,000 bond issue was passed by the county of Wayne, 90 per cent of whose population is in metropolitan Detroit, for purchase of a joint city-county airport. But it hasn't been purchased yet, and won't be, until after a grand jury, which began its sessions August 21, gets through sifting the maze of bribery rumors that burst forth just as the recommendations for purchase of a site were about to be laid down. If the jury completes its work before September 17, it is possible that the county supervisors will be able to maintain some unity among themselves and take up the purchase during their quarterly session opening on that date.

FIVE young Detroit business executives this past month joined the ranks of those who are turning to aviation for both pleasure and profit. They are training for private pilots' licenses in the newest flying school in this vicinity, operated by Leonard S. Flo, formerly of the First Pursuit Group at Selfridge Field, and more recently pilot for the Wisebirds, Inc., the group of Detroit capitalists who inaugurated a club plan of ownership of a fleet of three airplanes for business and pleasure use. His five business clients are Gaylor Norton, Philip Knight, Robert S. Murphy, R. C. Leonard and Warner H. Kimball. Norton has just purchased a Spartan plane.

THE largest air mail shipment in the history of the world left Lansing, Mich., for Chicago, August 21. It required 18 Stinson Detroiters to carry the 350,000 letters, aggregating ten tons. The postage collected by the Thompson Aeronautical corporation, operators of the line, was $16,000. The Reo Motor Car Company was the shipper. The letters inaugurated a new advertising campaign for this firm's latest line of motor cars.

H. F. ROUGH has assumed charge of the Michigan-Indiana-Kentucky office as inspector for the Bureau of Aeronautics, Department of Commerce, with headquarters here, succeeding Marshall S. Boggs, who has gone into the air regulations division at Washington. About 100 candidates for pilots' licenses took the first examination here recently.

LEONARD S. FLO, well known through his long connection with the First Pursuit Group at Selfridge, and later as chief pilot of the Wise Birds Club, resigned the latter post a few months ago and has organized the Flo Flying Services, Inc., with headquarters at Ann Arbor. Flo's new company has been appointed to operate the Ann Arbor Municipal Airport located just three and one-half miles south of the stadium.

In addition to providing all types of aerial service at Ann Arbor, Flo Flying Services, Inc., has prepared for use a new field in Fordson at the corner of Wyoming Avenue and Ford Road, on land owned by Secretary of State, John S. Haggerty. This field, which has been completed and is in perfect condition, is very convenient for the students of the Flo School of Flying living in or near Detroit, as it can be reached from any part of downtown Detroit in less than twenty-five minutes.

Flo has secured the Michigan distributorship for the Spartan biplane, manufactured in Tulsa, Oklahoma. He is using Spartan planes in training pupils.

THE Stout Air Service, Inc., has passed the 50,000 mark in passengers carried since they first began operations from here to Grand Rapids August 1, 1926. That line was abandoned after 12 months. The line to Cleveland and the sightseeing operations have attracted the bulk of this 50,000 in the last 12 to 15 months. The biggest month in its history for 15-minute aerial tour passengers was July, with 7,620 passengers. The concern now operates in four cities, Detroit, Cleveland, Toledo and Cincinnati.

THE Detroit Board of Commerce is sponsoring the Evans Glider Clubs project. Donald F. Walker has been appointed manager with offices at 1504 Dime Bank Building.

The clubs have as their purpose the stimulation of knowledge of and interest in the elementary principles of aviation through the building and flying of glider airplanes.

The Evans Glider Trophy, valued at approximately $5,000, was presented by Edward S. Evans at the Air Olympic Trophy Dinner held July 28.

It is planned to hold the first national contest among members of glider clubs throughout the country during the second All-American Aircraft show in Detroit next spring, following the preliminary individual club contests and state contests.

The first American glider pilot who establishes a duration record of 10 hours or more will receive a special cash prize of $2,000 and for each additional hour above the 10 hours he will be given $100 an hour up to 20 hours.

PIONEER SUPERIORITY

These totals of points and prize money won show how superior Pioneer Instruments are

POINTS WON BY PIONEER EQUIPPED WINNERS	172,868.5
POINTS WON BY OTHERS	40,075.2
PRIZE MONEY WON BY PIONEER EQUIPPED WINNERS . .	$10,200.00
PRIZE MONEY WON BY OTHERS . .	$1,800.00

Results of the National Air Tour show conclusively that Pioneer Instruments are favored—and rightfully so—*by leading pilots and manufacturers.*

PIONEER INSTRUMENT COMPANY
754 LEXINGTON AVE. BROOKLYN NEW YORK

45 JARVIS ST., TORONTO · · *General European Representative* · · M. CALDERARA · · 11 BIS RUE LA MONTAIGNE · · PARIS · · FRANCE

NEW AIRLINE ROUTES and SCHEDULES

THE following new airline schedules and changes in schedules have been established since the August issue. A complete list of mail, passenger and express airlines was printed in the December issue. New lines opened since that date or new schedules have been added in each succeeding issue.

Air Mail, Passengers, Express

C. A. M. 26—SALT LAKE CITY, OGDEN, UTAH; POCATELLO, IDAHO; BUTTE, HELENA, GREAT FALLS, MONT. (Opened August 1, 1928.) Operated by National Parks Airways, Inc.

Time Table

Northbound (Read down)			*Southbound (Read up)*
10:20 a.m.	Lv.	Salt Lake City, Utah	Ar. 2:10 p.m.
10:50 a.m.		Ogden, Utah	1:50 p.m.
12:40 p.m.		Pocatello, Idaho	12:10 p.m.
3:00 p.m.		Butte, Mont.	9:40 a.m.
3:45 p.m.		Helena, Mont.	8:55 a.m.
4:30 p.m.	Ar.	Great Falls, Mont.	Lv. 8:00 a.m.

Passenger Rates

	Salt Lake	Ogden	Pocatello	Butte	Helena	Great Falls
Salt Lake City	..	$5.00	$17.50	$37.50	$44.00	$50.00
Ogden	$5.00	....	14.00	34.00	40.00	46.00
Pocatello	17.50	14.00	.. .	22.00	28.00	37.50
Butte	37.50	34.00	22.00		7.00	16.50
Helena	44.00	40.00	28.00	7.00	....	10.00
Great Falls	50.00	46.00	37.50	16.50	10.00	....

Reservations and Information

Salt Lake City, Utah—National Parks Airways, Continental Bank Bldg.; Airport.
Ogden—Bigelow Hotel or Chamber of Commerce.
Pocatello—Bannock Hotel.
Butte—Intermountain Transportation Co.; Chamber of Commerce.
Helena—Chamber of Commerce.
Great Falls—Chamber of Commerce; Airport.

Air Mail

C. A. M. 16—CLEVELAND, AKRON, COLUMBUS, DAYTON, CINCINNATI, OHIO; LOUISVILLE, KY. (Opened August 1, 1928.) Operated by Continental Airlines, Inc., P.O. Box 951, Cincinnati, Ohio.

Time Table

Southbound (Read down)			*Northbound (Read up)*
4:30 a.m. E.T.	Lv.	Cleveland, Ohio	Ar. 8:30 p.m. E.T.
5:05 a.m. E.T.		Akron, Ohio	8:05 p.m. E.T.
6:25 a.m. E.T.		Columbus, Ohio	6:45 p.m. E.T.
7:10 a.m. E.T.		Dayton, Ohio	6:00 p.m. E.T.
7:50 a.m. E.T.		Cincinnati, Ohio	5:20 p.m. E.T.
8:00 a.m. C.T.	Ar.	Louisville, Ky.	Lv. 3:00 p.m. C.T.

Passengers

YAKIMA, WENATCHEE, WASH. (Opened August 9, 1928.) Operated by Western Airlines, Inc.

Time Table

Northbound (Read down)			*Southbound (Read up)*
8:00 a.m.	Lv.	Yakima, Wash.	Ar. 2:45 p.m.
9:00 a.m.	Ar.	Wenatchee, Wash.	Lv. 1:45 p.m.

Passenger Rates

$10.00 one way.
$17.50 round trip.

Reservations and Information

Western Airlines, Inc., at Yakima Airport (Phone 80).
Auto Club of Washington, Yakima, Wash. (Phone 80).

Passengers

TULSA-OKLAHOMA CITY; PONCA CITY; OKMULGEE, OKLA. (Effective August 17, 1928.) Operated by Paul R. Braniff.

Time Table

For Oklahoma City			
Lv. Tulsa	8:30 a.m.	Ar. Oklahoma City	9:45 a.m.
Lv. Tulsa	1:30 p.m.	Ar. Oklahoma City	2:45 p.m.
Lv. Tulsa	6.00 p.m.	Ar. Oklahoma City	7:15 p.m.
Lv. Okmulgee	7:45 a.m.	Ar. Oklahoma City	9:45 a.m.
Lv. Ponca City	9:30 a.m.	Ar. Oklahoma City	2:45 p.m.
Lv. Ponca City	5.00 p.m.	Ar. Oklahoma City	7:15 p.m.

For Ponca City			
Lv. Tulsa	8:30 a.m.	Ar. Ponca City	9:20 a.m.
Lv. Tulsa	3:45 p.m.	Ar. Ponca City	4:45 p.m.
Lv. Oklahoma City	7:00 a.m.	Ar. Ponca City	9:20 a.m.
Lv. Oklahoma City	12:00 noon	Ar. Ponca City	4:45 p.m.
Lv. Okmulgee	7:45 a.m.	Ar. Ponca City	9:20 a.m.

For Okmulgee			
Lv. Tulsa	7:00 a.m.	Ar. Okmulgee	7:30 a.m.
Lv. Tulsa	6:00 p.m.	Ar. Okmulgee	6:30 p.m.
Lv. Oklahoma City	12:00 noon	Ar. Okmulgee	6:30 p.m.
Lv. Ponca City	9:30 a.m.	Ar. Okmulgee	6:30 p.m.
Lv. Oklahoma City	4:30 p.m.	Ar. Okmulgee	6:30 p.m.

For Tulsa			
Lv. Oklahoma City	7:00 a.m.	Ar. Tulsa	8:15 a.m.
Lv. Oklahoma City	12:00 noon	Ar. Tulsa	1:15 p.m.
Lv. Oklahoma City	4:30 p.m.	Ar. Tulsa	5:45 p.m.
Lv. Ponca City	9:30 a.m.	Ar. Tulsa	10:30 a.m.
Lv. Ponca City	5:00 p.m.	Ar. Tulsa	6:00 p.m.
Lv. Okmulgee	7:45 a.m.	Ar. Tulsa	8:15 a.m.
Lv. Okmulgee	6:40 p.m.	Ar. Tulsa	7:10 p.m.

Reservations and Information

Yellow Cab Companies in respective cities served.

Air Mail, Passenger, Express

ST. LOUIS, MO.; SPRINGFIELD, PEORIA, CHICAGO, ILL. (Opened August 20, 1928.) Operated by Robertson Aircraft Corp.

Time Table

Northbound (Read down) *Central Standard Time*				*Southbound (Read up)*	
No. 3 Mail Except Sat., Sun., Holidays *	No. 1 Passenger Daily Ex. Sun.		Ports	No. 2 Daily Ex. Sun.	No. 4 Mail Passenger Except Sun., Mon., Holidays *
4:15	‡9:00	Lv.	St. Louis, Mo.	Ar. 6:15	9:15
5:10	9:51	Ar.	Springfield, Ill.	Lv. 5:20	8:15
5:20	9:56	Lv.		Ar. 5:15	8:05
6:00	10:37	Ar.	Peoria, Ill.	Lv. 4:31	7:25
6:10	10:42	Lv.		Ar. 4:26	7:15
7:30	12:00	Ar.	Chicago, Ill.	Lv. §3:00	†5:50

* *Nos. 3-4 carry mail only. No passenger service.*
† *Departure of No. 4 is contingent upon the arrival of N.A.T. overnight plane from New York, due at 5:35 a.m.*
‡ *Connecting bus service leaves Hotel Statler 8:15 a.m. (Fare $1.50).*
§ *Connecting bus service leaves Hotel Stevens 2:20 p.m. (Fare $1.50). Bus service from airport to downtown hotels is available at ports of call.*
Time from 12:01 p. m. to midnight is shown in heavy faced figures.

Passenger Rates

Between	St. Louis	Springfield	Peoria	Chicago
St. Louis	....	$15.00	$27.50	$40.00
Springfield	$15.00	....	12.50	35.00
Peoria	27.50	12.50	....	22.50
Chicago	40.00	35.00	22.50	....

Reservations and Information

Robertson Aircraft Corporation at:

Chicago, Ill.—Municipal Airport (Hemlock 9155); Ralph N. Gardner, Div. Traf. Mgr., 1611 Bankers Bldg., 105 W. Adams St. (Central 3003).
Peoria, Ill.—Varney-Peoria Airport (County 32-R-4); O. L. Spence, City Traf. Mgr., Assn. of Commerce Bldg., 231 So. Jefferson St. (Telephone 7156).
Springfield, Ill.—Springfield Commercial Airport (County 850-R-4); H. Vernon Cheatle, City Traf. Mgr., Leland Hotel, 6th and Capital Sts. (Main 3266).
St. Louis, Mo.—Lambert-St. Louis Airport (Avery 2725-2726); H. J. McNally, Gen. Traf. Mgr., Planters Bldg., 4th and Pine Sts. (Main 3556).
Reservations may also be made at all leading hotels and tourist agencies.

THE MODERN AIRPLANE

"THE Modern Airplane" was written for that rapidly increasing group which represents a large proportion of our population—"air-minded" America. It is a plain English treatise on the theory of mechanical flight and practical flying, by Bertram W. Downs. It tells why an airplane flies, how it is controlled, how to become a pilot. In its 125 pages the following subjects are dealt with:

Airfoils, Lift and Drag, Control, Inherent Stability, Interesting Points in Design, Construction of Airplanes, Practical Flying, The Slotted Wing, The Weather and Aviation, Airports, Airways, Safety, Pilot Licenses, The First Lesson in the Air, Nomenclature and Common Terms.

The subject matter is explained by many clear drawings by Douglas Rolfe, aeronautical illustrator, as well as photographs illustrating points in construction and general views of modern airplanes.

AIRPORT ILLUMINATION

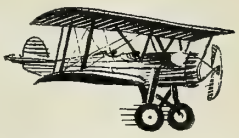
"AIRPORT ILLUMINATION" is the subject of Bulletin GEA-982 of the General Electric Company, of Schenectady, N. Y. Views of lighted airports are shown, and description given of rotating beacons, boundary lights, 180-degree floodlights, airport twin floodlights, ceiling lights, wind cone lights, air marking signs, transformers, wire and cable, control, battery chargers, and wiring devices. There is also a table of the Mazda lamps for the different beacons and lights, with dimensions and hours of life. The cover shows a painting of an airport at night, and the frontispiece is a map of commercial airlines within the United States.

LINDBERGH WALL MAP

A LARGE decorative wall map showing Lindbergh's flights, from his first barnstorming to the famous flight to Canada carrying serum for Floyd Bennett, has been published by the John Day Co. of New York. Lindbergh's route as an air mail pilot, his trip from San Diego to New York, the epic flight across the Atlantic, his National tour, his swing through the air to Mexico and Central America—all are clearly traced in this graphic chronicle. The map was designed and illuminated by Major Ernest Clegg, noted British cartographer.

Illuminated seals of the countries Lindbergh has visited, and the orders and decorations which have been presented to him, make decorative notes, lending this map unusual richness. An index and a scale of nautical miles, and numerous explanatory legends make it a compact history of Lindbergh's activities.

With the national air tour 1928 winner - all the way



Member: Aeronautical Chamber of Commerce of America, New York

NORTHERN AIRWAYS, INC.
John P. Wood, President
WAUSAU, WISCONSIN

Distributors of WACO Airplanes in Wisconsin & Minnesota

Flying Field Alexander Airport at Wausau, Wisconsin

July 28th, 1928

Kendall Refining Company,
Bradford, Pa.

Gentlemen: -

When I began my plans for entering the National Air Tour I was not unmindful of the fact that lubrication would play a very important part in determining the winner.

With this in mind your oil was tested along with many other grades and after deciding to use Kendall it was gratifying to me to know that it would be available at all the stops.

I can truthfully say that I have never before obtained such satisfactory results from any lubricant I have ever used and credit for winning first place is due in no small measure to the high quality of Kendall Penzbest Motor Oil.

We passed through some very hot weather, climbed to high altitudes and in every way subjected the oil to severe duty, but at all times the motor functioned properly, pressure was maintained and temperature was uniformly low.

Appreciate the service and cooperation rendered me by your representatives at the various stops and with kindest personal regards, I am

Sincerely yours,
John P. Wood

100 Acre Four Way Field



Complete Service Facilities

John P. Wood pays tribute to Kendall Penzbest Oil

IN the supreme test of speed, endurance and carrying capacity against a picked field, only flawless lubrication could bring in a winner. Constant oil pressure, a cool running motor, clean spark plugs, easy starting, and a lubricant that functions at all temperatures and under all conditions, form a winning combination.

That is why John P. Wood picked Kendall Penzbest Oil for use in his Waco in the National Air Tour—6300 miles of hard flying. His selection was justified by his magnificent record in rolling up a total of 27,013.4 points to win the race.

Kendall Penzbest Oil helps to bring in winners because it is all oil. The wax has been extracted. No acids are introduced in the refining. There is, therefore, nothing in it to thin out under extreme heat or to render it sluggish at low temperatures.

Kendall Penzbest is derived entirely from Bradford grade of Pennsylvania crude, the world's finest grade. Because it is free from all impurities, it retains its splendid body under all conditions. After thirty hours of flying you will find that Kendall Penzbest is still a better lubricating oil than most other oils after ten to fifteen hours. So—you drain your Kendall Penzbest much less often.

May we send you a copy of "Ground Flying on the Subject of Lubrication"? Address, Aviation Division, Kendall Refining Company, Bradford, Pa.

BUY AT THIS SIGN KENDALL PENZBEST MOTOR OILS IT IS YOUR PROTECTION

KENDALL PENZBEST MOTOR OIL

REFINED FROM 100% BRADFORD GRADE OF PENNSYLVANIA CRUDE

KANSAS AIR NEWS

By Edwin W. Pryor

WICHITA will be well represented in the New York-Los Angeles air derby in September, according to Dudley Steele, race manager. Three Cessna cantilever wing monoplanes have been entered. Two of them, to be flown by Jay Sadowsky, chief test pilot for Swallow Airplane company, and Chief Francis Bowhan, chief pilot for Cessna, will be powered with Wright Whirlwinds. The third will be in Class A, equipped with a Warner motor and flown by G. Curtis Quick, motor engineer for Cessna.

Two Laird Whippoorwills, cabin biplanes, will be in the race, and the Swift, Travel Air and Swallow plants will be represented by entries.

The racers will be here September 7. Howard Fleeson, vice president of the Wichita Flying club, will have charge of the field; Roscoe Vaughan will be chief starter; A. E. Merriam will be timekeeper and Major H. G. Odell will be referee.

W. J. PATTERSON, veteran park department employee of Wichita, has been appointed manager of the municipal airport, recently leased by the city from the Wichita Boosters, Inc., which purchased and equipped the field some months ago.

This field will be maintained by the city for a year, when the new mile-square field known as the California section will be equipped and maintained by the city as a municipal airport.

CLIFF DURANT, of Roscommon, Mich., has ordered a second Stearman biplane, a special job equipped with a Wright Whirlwind motor.

Other Stearman orders include: L & H Aircraft Corporation, Hartford, Conn.; A. I. Ivanhoff, president of Skyways, Inc., Boston, for his private use; Mamer Flying School, Tacoma, Wash.; R. L. Brooks, New York; the Nassau county, N. Y. police force; and Walter T. Varney, president of Varney Airways, Salt Lake City, for his private use.

OLIVER A. ROSTO, recently appointed aeronautical inspector of the Department of Commerce, has been stationed in Wichita to continue the factory system of inspection installed by Major W. E. Breingan, inspector.

Major Breingan, better known as "Scottie", will leave soon for Troy, O., to install the new inspection system in the Waco factory.

ROBERT HASTY, director of the Wichita Air Service Provision Company and candidate for lieutenant governor of Kansas, stumped the state in a plane during his campaign, saving much time and covering more territory than would have been possible otherwise.

TRAVEL AIR biplanes will be used by the Western States Aero Corporation in its flying schools at Salt Lake City and Los Angeles, Manager H. P. Mitchell announced recently when in Wichita to accept delivery on two planes of an order for several.

During the week ending July 28th, deliveries of Travel Air planes totaled 18; for the week ending August 4, there were 16 deliveries; and for the week ending August 11th deliveries totaled 15 planes.

ADDITION of another unit to the Stearman Aircraft Company in Wichita, doubling the floor space and enabling a material increase in production, has been made.

The new unit, leased from the Bridgeport Machine company, will be devoted to the production of the Stearman cabin biplanes, while the present unit will continue to turn out the standard open jobs and special orders. A wing is being added to the present unit for offices. The new lease is for three years, and includes the field now used for testing ships.

Production now is two and a half planes a week, but that will be increased soon, a motor shortage having hindered operations.

The Stearman plant has arranged for a number of the new type Wright motors which are to be placed on the market next spring. The cabin jobs will be powered with the nine-cylindered motor, turning up 300 horsepower, according to present plans, and the standard open job will use the seven-cylinder, 200-horsepower motor. Company officials also are planning the production of a two-seater training plane to use the five-cylinder, 140-horsepower motor.

Stearman may enter the multiple-motored cabin plane field, too, according to Lloyd Stearman, president. Varney Airways has asked the company to consider the production of three- or four-motored cabin biplanes to be used on the proposed Varney passenger airline from Salt Lake City to Seattle.

THE Wichita Aeronautical Institute has been formed at Wichita with George H. Siedhoff, president of the Stone Propeller Company and stockholder in the Cessna Aircraft company, as president. Other officers are: vice president, A. Koerbling; secretary-treasurer, A. B. Sanders; directors, W. B. Harrison, president of the Union National Bank; John Engstrom, lumber man; A. E. Merriam, oil man, Mr. Siedhoff and Mr. Koerbling.

George H. Arbenz will be general manager of the institute, which will have headquarters in Hotel Broadview, owned by Mr. Siedhoff. James E. Akers, former Lions' International organizer, will be in charge of the field organization seeking students; and Mr. Koerbling, resigning from his Department of Commerce position, will be the head of the technical flying school. Joseph Schaeffer, former engineer for the Blue Streak Motors company, will be in charge of shops for the engineering department.

It is the plan of the institute to offer a correspondence course in both aeronautics and aeronautical engineering, bringing students to Wichita for actual flying instruction and shop experience.

A WOMEN'S aeronautical association of Wichita, to become a chapter of a proposed women's National Aeronautic Association, has been organized.

Seventeen women attended the organization meeting, including Miss Wanda Cessna, daughter of Clyde V. Cessna, president of the Cessna Aircraft company; Miss Olive Ann Mellor, Travel Air factory; Miss June Harrison; Miss Jewel M. Knorp; Mrs. W. B. Harrison; Mrs. Roscoe Vaughan; Mrs. Lloyd Stearman, wife of the Stearman Aircraft company's president; Mrs. Hugh Amick; Mrs. C. V. Cessna; Mrs. Ted Braley, Braley Flying School; Mrs. M. T. Hargiss, Cessna Aircraft company; Mrs. Mac Short, Mrs. W. E. Titus, Mrs. F. L. Rawls, Mrs. J. P. Verts, Mrs. K. K. Shaul, Mrs. H. W. Sullivan, Mrs. E. W. Kolthoff, and Mrs. Charles Lander.

Others who have joined since are Mrs. Walter Innes, Sr., Mrs. Marcellus Murdock, Mrs. Victor Roos, Mrs. Perry Hutton, Mrs. Earl Hutton, Mrs. Wilbur Neely, Mrs. A. E. Merriam, and Mrs. Stewart M. Young.

The membership of the new organization is to be confined to women who are student pilots, plane owners, fliers, wives, sisters or mothers of fliers, stockholders in aviation concerns, or otherwise directly interested in flying.

The W. A. A. will aid the men's organizations in entertaining aeronautical visitors to Wichita.

Miss Mellor flew to Detroit carrying greetings from the local club to the women's organization there. She and Miss Mildred Park of Wichita were passengers in a Travel Air biplane piloted by W. H. Emery of Bradford, Pa.

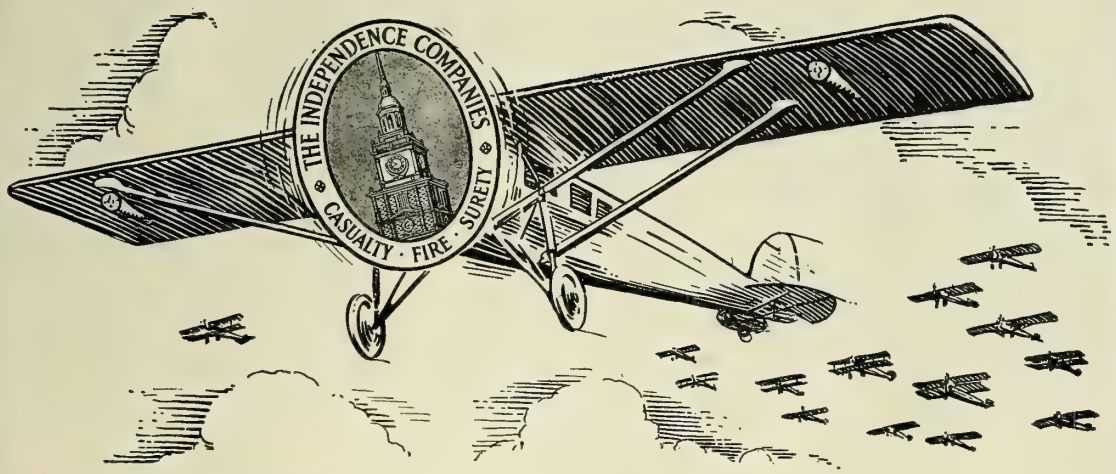
A SAFETY spark plug, designed especially for use in airplanes, will be produced in quantities at Wichita in the near future. The company, now a partnership but soon to be incorporated with Wichita capital, is known as the Ace Spark Plug company.

It is the invention of J. P. Ritchey, financed by McGinnis Moore, oil operator and president of Swallow Airplane company. Ritchey and Moore have leased a plant at Wichita and will start production immediately. During the war Ritchey was an officer in the air school at Dayton. He is a brother of W. R. Ritchey, of the Swift Airplane company.

Ritchey's plug is believed to be the only one in the world that fires twice and is guaranteed to stand up 100 hours in plane motors, and has proved successful in auto motors.

THE first Floco-motored Cessna monoplane ever turned out by the factory at Wichita was delivered recently to Homer Hoghland, Cessna dealer at Buffalo, Minn. Cessna has been concentrating on Anzani and Whirlwind motors, but has ordered a Warner and a Comet for installation. Travel Air, too, has ordered a Warner motor.

THE Stearman Aircraft Company of Wichita has obtained the services of Homer Kelly as advertising counselor. Mr. Kelly will coöperate with the sales department of that company in carrying out its advertising program. (*Continued on next page*)



"ALL-IN-ONE"

FIRE, LIGHTNING & TRANSPORTATION

ACCIDENTAL DAMAGE

THEFT, ROBBERY *and* PILFERAGE

PUBLIC LIABILITY

PASSENGER LIABILITY

PROPERTY DAMAGE

TORNADO, CYCLONE *and* WINDSTORM

OTHER POLICIES COVER
PERSONAL ACCIDENTS · CARGO RISKS
COMPENSATION *and* EMPLOYER'S LIABILITY

First!

The Independence Companies of Philadelphia were the *first* American companies to offer complete aviation insurance coverage to those engaged in the manufacture or flying of aircraft.

In July 1926, these Companies announced their Comprehensive "All-In-One" Policy combining the insurances listed at the left.

Today, the Companies' list of aviation policyholders—representative of this new and rapidly growing industry—includes such names as:

Col. Charles A. Lindbergh, James Fitzmaurice, Sir George Hubert Wilkins, The Daniel Guggenheim Fund for the Promotion of Aeronautics, Ford Motor Co., Boeing Air Transport, Western Air Express, National Air Transport, American Railway Express, Robertson Aircraft Corp., United Cigar Stores, Pitcairn Aviation, Colonial Air Transport, Colorado Airways, Fox Film Corp., Stout Air Service, Philadelphia Rapid Transit, Northwest Airways, Boston Airport Corp., Universal Film Corp., Royal Typewriter Co., Walter T. Varney, Inc., Southern Dusting Co., Fairchild Aerial Surveys, Fairchild Flying Corp., Pacific Marine Airways, Andian National Corp., and many others.

INDEPENDENCE INDEMNITY COMPANY

The INDEPENDENCE COMPANIES

Home Offices — PHILADELPHIA

CHARLES H. HOLLAND, President

Casualty Insurance · Surety Bonds
Fire Insurance

INDEPENDENCE FIRE INSURANCE COMPANY

These Companies maintain Human Relations with their Agents, Brokers and Policyholders

(Kansas Air News continued)

LIEUT. JOHN O'REILLY KELLY, sales manager of the Swallow Airplane Company, Wichita, has reported for two weeks' active duty at Marshall Field, Fort Riley.

TRAVEL AIR GOOD-WILL TOUR

TO further the interests of aviation in the middle west and the east as well as to exhibit their newest cabin monoplane to distributors, dealers and prospective purchasers, O. G. Harned, sales manager of the Travel Air Manufacturing Company, recently completed a successful 3200-mile good-will tour, including Des Moines, Minneapolis, Madison, Chicago, Detroit, Buffalo, Syracuse, Albany, Boston, Roosevelt and Curtiss Flying Fields and returning through Albany, Syracuse, Buffalo, Cleveland, Cincinnati, Indianapolis and St. Louis. The plane was demonstrated to over 700 prospective purchasers in 18 cities in 21 days.

In checking up the log upon the return of the ship to Wichita, Mr. Harned found the average speed to be more than 100 m.p.h., with gas consumption less than 11 gallons of gas per hour. Maximum loads of passengers and baggage were carried in practically every instance from city to city.

AERO ENGINEERING SERVICE COMPANY

THE Aero Engineering Service Company, Inc., of Wichita, Kansas, offers a complete course in Practical Applied Aero Engineering. The principal officers, stockholders and engineers forming the personnel of the institution are actively connected with other aircraft firms in the city. Prominent among these are listed the names of Clyde V. Cessna, president of the Cessna Aircraft Company; Victor H. Roos, secretary-treasurer and general manager of the Swallow Airplane Company; and Fred R. McConiga, aeronautical engineer and designer. Mr. McConiga is the chief engineer and general manager of the Aero Engineering Service Company.

The course of instruction is adapted particularly for home study work. The company is in constant touch with the developments of the aeronautical industry, and after certain portions of work have been completed by the student the company seeks to place him in a position where he may better learn through application of his theory.

Mr. McConiga is chief of the staff of instructors. Associated in the engineering department are Amos O. Payne, chief engineer of the Swallow Airplane Company and Dean of Aviation at Wichita University; A. R. Warner, aeronautical draftsman; F. R. Jarvis, chief draftsman, Swift Aircraft Company; A. E. Barrett, construction, engineer, Stinson Aircraft Corporation, Detroit; Miss Viola Ellis, assistant to general manager. The extension department and sales organization is under the direction of H. W. Sims, extension department secretary. The field manager is R. H. Haley, who is assisted by W. P. Early.

CHICAGO AIR NEWS

By Duke Jordan

PREPARATIONS are being made here for an aeronautical exposition to be held at the Coliseum from December 1 to 9. It is timed to allow foreign air ministers who will come to Washington for the international air conference on December 12 to visit Chicago first.

BEFORE August 1, when an intensive campaign was inaugurated to educate the public to use air mail with the new rates, the National Air Transport Company carried slightly less than 100,000 letters a day, according to Col. Paul Henderson. Since then, with the advent of the talking mail boxes and other publicity, the average has been in excess of 125,000.

THE delay necessitated in removing air mail from the postoffice to the municipal airport, seven miles from the loop, has led air-minded citizens to urge immediate construction of an island airport to be located in Lake Michigan off Grant Park, between Sixteenth and Thirty-first Streets, just south of the business district.

DURING the month of July, 3,609 passengers were carried by individual contractors from the municipal airport. Air mail contractors carried 110. This figure does not include pilots regularly scheduled with the air mail or students learning to fly. Seven hundred and fifteen planes arrived and departed without a serious accident.

PILOTS LEO MULCAHEY AND ARTHUR E. DERBY are planning a passenger service between here and Rockford, Ill. They are seeking a suitable landing field at Rockford for the Prairie Air Service Company.

THE new air mail line from Chicago to Atlanta has its Chicago terminal at the Gray Goose hangar at the municipal field.

AURORA, ILL., FIELD

THE Midwest Airways Corporation of Monmouth, Ill., has opened a new flying field at Aurora, Ill., and will establish headquarters for the company at the airport, which is located adjacent to the Exposition Park north of the city. The field was opened August 10 by John H. Livingston, president and general manager. The company also operates fields at Monmouth and Waterloo, Iowa.

A fifteen-ship steel hangar, located on the north side of the field, has been completed. The Aurora field has been lighted as an emergency air mail landing field for the Chicago-Kansas City line. It will serve as sales and service headquarters for Waco and Ryan airplanes in the metropolitan area of Chicago, being located only twenty minutes by air from the loop. Service facilities and repair parts will be available.

INTERSTATE AIRLINES AWARDED CHICAGO-ATLANTA AIR MAIL CONTRACT

THE Interstate Airlines, Inc., of Chicago, was awarded C. A. M. No. 30, Chicago to Atlanta air mail contract. The company's bid was 78 cents per pound.

The company is headed by Lawrence W. Scudder, president; Commander Charles T. Blackburn, vice president; and Robert T. Sherman, secretary and treasurer.

The directors include Leonard A. Busby, president, Chicago City Railways; Charles C. Dawes, investment banker; L. Norman Van Sicklen, Jr., vice president, A. B. Leach & Co., investment bankers; Page J. Thibodeaux, Jr., insurance broker; J. Parker Van Zandt, president of Scenic Airways, Inc.

The tentative plans are to operate a day passenger schedule in conjunction with the night mail schedule.

SCENIC AIRWAYS, INC., of Chicago, recently ordered six Fairchild monoplanes for operation on their new airline between Kansas City, Mo., and Albuquerque, N. M., in conjunction with the A. T. & S. F. Railroad. Several novel features have been incorporated in these ships, among the more noteworthy being the seating arrangement with swivel chairs, and the special lavatory and baggage compartments.

INTERNATIONAL AIR EXHIBIT AT CHICAGO

THE Aeronautical Chamber of Commerce of America, through Aeronautical Expositions Corporation, has leased the Coliseum and Annexes in Chicago for an International Aircraft Exposition, December 1 to 9, inclusive.

The Chicago Show will be the first International Aircraft Exposition to be held in the United States since a year following the World War. The date of the Chicago Show was set after the Chamber had been apprised of the desire of President Coolidge that the American aircraft industry hold an exposition prior to the International Conference on Civil Aeronautics which he has called to be held in Washington, December 12, 13 and 14.

The Chamber will open offices in Chicago which will jointly serve the business affairs of the Exposition and also specialized matters falling within the Great Lakes Division of the organization.

The Chicago Exposition will have two distinct phases: One has to do with commercial aviation and the other with international aeronautical relations. It is estimated that between 25 and 35 representatives of foreign powers accredited to the Washington Conference, will desire to visit the Chicago Show. The following committee has been appointed to consider ways and means for the entertainment of these distinguished visitors:

Elmer T. Stevens, president, Charles A. Stevens & Bros.; George B. Foster of the Commonwealth Edison Company and Chairman of the Aviation Committee of the Chicago Association of Commerce; James Simpson, president, Marshall, Field & Company; George Getz, capitalist; Earle H. Reynolds, president, Peoples Trust & Savings Bank and president, National Air Transport, Inc.; Major Reed G. Landis, secretary of the Chicago Aero Commission. Major Landis will act as secretary of this committee.



Quality Demanded Quality Achieved

It is a source of extreme gratification to us that, numbered among our clientele, are such as those represented by the order heads reproduced on this page.

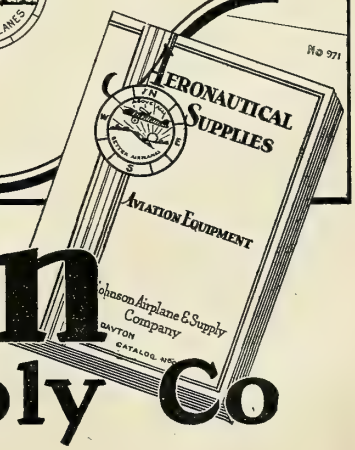
And it is additionally gratifying to realize that they are manufacturers and operators whose specification and inspection standards demand the highest quality in every material entering into their product.

We are strategically located beside Wright Field and the world's largest Aircraft Experimental Laboratories, constantly in touch with the latest and best developments. Our experience as airmen, designers and builders has been wide, our manufacturing facilities are developed and our organization thoroughly versed in the needs of the industry.

Our stock of Quality Aircraft material and supplies is large and Johnson Service a byword among manufacturers. Here the needs of the industry are not only met, but anticipated.

No order is too large, none too small for our most careful and prompt attention.

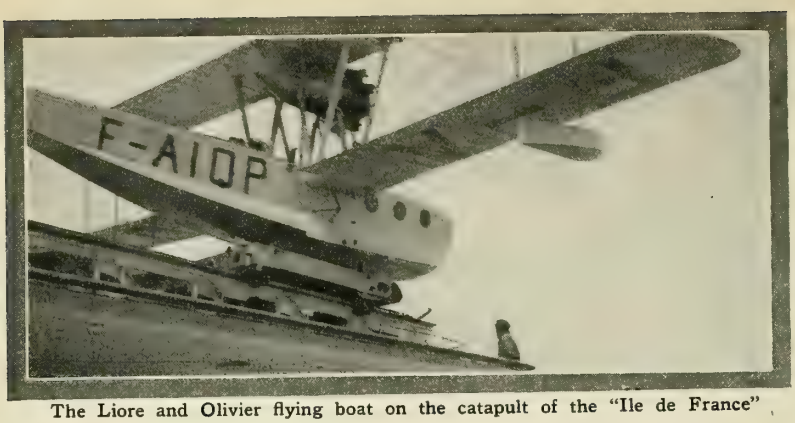
ABOVE ALL BETTER AIRPLANES



Johnson Airplane & Supply Co

Dayton, Ohio

Say you saw it in AERO DIGEST



The Liore and Olivier flying boat on the catapult of the "Ile de France"

SHIP-TO-SHORE SERVICE ON THE FRENCH LINE

CATAPULTED from the after-deck of the French liner *Ile de France* at 1:09 p. m. while the ship was still 450 miles at sea, the flying boat, F-AIQP, with three sacks of special mail landed at the Battery, New York City, at 5:16 p. m., July 13. After its crew had been passed by Quarantine doctors and by customs and immigration officials, the plane proceeded immediately to the French Line pier where the mail was transferred to a waiting truck and rushed to the postoffice. The first letter was delivered at 7:30 p. m., more than fifteen hours earlier than the regular mail from the *Ile de France*. Before the ship had tied up at its dock next morning, some of the letters specially stamped and addressed for American air mail service had been carried as far as Chicago by night planes.

The crew of the plane consisted of Lieut Demougeot of the French Navy, pilot; B. Monrouzeau, radio operator; and H. Le Tierce, mechanic. They were welcomed by M. de Maglaive, local director of the French Line; M. Cauchois, assistant director of the line; and M. Mongendre, French Consul-General in New York.

The postal charges for this new service are $1.00 for ½ ounce for first class mail and 25 cents for 2 ounces for printed matter and merchandise. Passengers too may take advantage of this ship-to-shore plane but tariff rates for passengers have not yet been announced.

The seaplane used for the flight is a Liore and Olivier flying boat powered with a 420 h.p. Gnome-Rhone-Jupiter air-cooled engine. The plane is the same type used in the Paris-Madagascar and return flight last year. Besides the crew of three, there is room for six passengers, baggage and mail. It took only mail and no passengers on the first trip.

The plane has three different radio sets—one long wave, one short wave, and one Cardwell radio. All three can be used when the plane is in the water. The plane is completely furnished with up-to-date navigation instruments.

The catapult on the deck of the *Ile de France* has a length of 111 feet, 7 inches. Its runway is 88 feet, 7 inches and its weight, 60 tons. Worked by compressed air, the catapult may be operated either by the pilot himself or by an attendant on the steamer. It can throw 4 tons 112 m.p.h. and 8 tons 68 m.p.h. The Penhoet Shipyards at St. Nazaire, the only company building catapults in France, built this catapult for the French navy.

General Data on the Liore and Olivier Flying Boat

Weight, empty	3,858 pounds
Weight (normal)	6,503 pounds
Weight (maximum)	7,385 pounds
Span, wing	53 feet 6 inches
Wing area	688 square feet—128 square inches
Length	47 feet 7 inches
Height	13 feet 8 inches
Speed	105 m.p.h.
Speed at ground	112 m.p.h.
Gasoline capacity	185 gallons
Oil capacity	18½ gallons

This plane can reach an altitude of 13,123 ft. and can fly seven hours at 90 m.p.h.

NEW RFL AIRCRAFT RADIO LABORATORY

By Capt. Russel Meredith

Aircraft Division, Radio Frequency Laboratories, Inc.

UNTIL recently the only institutions in this country which concerned themselves with radio aids to aeronautics were the Army, Navy and the Bureau of Standards of the Department of Commerce. A few installations of receivers and transmitters had been made on commercial planes, but they were more or less obvious adaptations of something already in existence rather than novel developments designed to cope with the special problems met with in the application of radio to aviation.

It was during collaboration with the Bureau of Standards in development work on the radio beacon that the Radio Frequency Laboratories, Inc. of Boonton, N. J., realized that no really scientific attempt had been made by any civilian agency to solve the special problems encountered in airplane radio development. Heretofore there had been little demand from other than the military for such a solution. Neither had there been a general realization that any novel problems existed.

Being already equipped with excellent facilities for radio research and numbering on its staff some of the ablest radio research engineers in the country, it was decided last spring to add an aircraft division to the laboratory. The RFL does not manufacture or sell any of its developments, being purely a research and patent-holding organization; hence it is able to devote all of its efforts to the engineering aspects of any problem, and obtain results with the least practical delay. Prior to this decision to adopt a definite aircraft program it had been necessary to transport apparatus to Washington for tests in the Bureau of Standards plane. The inconvenience of this arrangement led to the installation of its own field, special aircraft radio laboratory, hangar, and flying equipment.

The first consideration was the location of a suitable tract not too far from the main laboratory. Such a place was found in Rockaway Valley. In spite of the naturally mountainous nature of the country in that vicinity, the site chosen is ideal. By road it is but three miles from the D. L. & W. Railroad station at Boonton and about the same distance from the Mt. Lakes and Denville stations. The main runway is 2,500 ft. long and 1,200 ft. wide and is intersected at right angles by another runway of the same dimensions. Even before any grading had been done it was in suitable condition for landing any type of plane. A heavy turf overlying gravel and sand understrata guarantees perfect drainage and the absence of soft spots in the worst weather.

The hangar is of concrete and steel 60 ft. deep with a door 80 ft. by 18 ft. It was built large enough to house the largest type plane which might come into the field. On the side of the runway opposite the hangar is the laboratory, a one story building 150 ft. long by 36 ft. wide. All shops, etc. pertaining to air operations are contained as auxiliaries to the hangar while the radio research apparatus and instrument shops will be housed in the laboratory. In addition to the housing of scientific apparatus, the laboratory contains sleeping quarters, kitchen, showers and a large library and living room containing a fireplace. Additional sleeping accommodations are provided at the hangar. These facilities are provided for the benefit of pilots and mechanics who may fly in for installation and test of radio equipment, and for other transients who may wish to avail themselves of the field, after the first of October.

The present flying equipment consists of one Berliner Monoplane powered with a Wright Whirlwind engine and especially equipped for radio work. The engine and plane are completely shielded to eliminate interference from the ignition system. It is intended before winter to purchase a Fokker Super-Universal powered with a Wasp engine so that experiments may be carried on with a minimum of discomfort during the cold weather.

A radio beacon, as well as facilities for night flying will be installed, as experimental work with the beacon is anticipated. The aircraft division of RFL contemplates, in addition to research on beacons and the development of airplane receiving and transmitting equipment, intensive investigation and development of general electrical and radio instruments for aids to navigation.

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MINNESOTA AIR NEWS

By W. S. Schley, Jr.

APPROXIMATELY 10,000 persons witnessed the air derby which followed the dedication of Austin's new municipal airport, Stout Field, named in honor of William B. Stout, prominent airplane engineer and builder.

The new field is located two miles from the city and has large runways each 3,000 by 1,000 feet in size. It is owned by the city and was obtained largely through the support of the Austin legion post.

CHICAGO AIRLINES, INC., recently inaugurated passenger air service between the Twin Cities and Chicago. The opening of this airline makes the fifth regular service out of St. Paul.

A NAVAL reserve aviation station was assured Minneapolis when the park board aviation committee approved plans for construction of a hangar at the Wold-Chamberlain field by the U. S. Naval Reserve. The hangar will be 80 by 90 feet in size and built of steel and concrete. The unit, consisting of one officer and five enlisted men, will arrive as soon as the hangar is completed.

THREE Twin Cities airlines were merged when the Mid-Plane Transit Company, the Northrop Airplane Company and the Air Transit Company, Inc., became known as the Northern Aeronautics, Inc. The "board of management" of the new company includes Paul Goldsborough, Marvin A. Northrop, Mark M. Hurd, James L. Pierce, Delmer Snyder and P. J. Kemp.

THE Northwest Airways and the Northern Pacific Railroad will open their new joint air-rail line September 1.

Eastbound planes will leave the Wold-Chamberlain airport, Minneapolis, daily for Chicago at 8:30 a.m., St. Paul at 8:40 a.m. (after arrival of Northern Pacific trains from West); and arrive at Cicero Field, Chicago, at 12:10 p.m., connecting with trains of all lines for East and South. Westbound planes will leave Cicero Field, Chicago, at 3 p.m., arriving at the St. Paul port at 7 p.m., and at Minneapolis at 7:10 p.m., connecting with the "North Coast Limited," leaving St. Paul at 11:05 p.m. and Minneapolis, 11:45 p.m., also with the Yellowstone "Comet". Passengers will be allowed to buy railroad tickets which will include the air hop. Airplane fare between St. Paul-Minneapolis is $45, including transportation between railway stations and flying fields. Eight hours will be saved by passengers using this service.

REGULAR seaplane schedule from Duluth to the Twin Cities has been inaugurated by the Northern Air Lines with a Ryan brougham seaplane. Two trips will be made daily. J. P. Holland flew the ship on its inaugural flight covering the trip in one hour and forty minutes.

AIR MAIL on the Northwest Airways out of the Twin Cities nearly tripled its former average when the new rate of five cents an ounce went into effect.

AFTER an intensive study of the improvements needed by St. Paul, a municipal committee has proposed a $500,000 airport bond issue to the city. Thirty thousand dollars would be spent for acquiring additional land, $337,000 for filling in the field, and $90,000 for surfacing the field.

THE new airport at Mankate will be formally opened within the next few weeks. The field consists of 107 acres.

Jefferson Airways, Inc.

JEFFERSON AIRWAYS, INC., is making two round trips daily between the Twin Cities and Rochester, Minn. A 14-passenger all-metal trimotored Ford is used. As a considerable portion of business to Rochester, Minn., naturally concerns the famous clinic of the Mayos, the plane is equipped so that any of its seats may be readily converted into berths for the accommodation of passengers who must be carried in that fashion. A number of special flights also are made as aviation bridge, luncheon and other parties have become a fad in both St. Paul and Minneapolis.

Patrick Gallup is pilot. Edgar F. Zelle, the president of the Airways Company, is also president of the Jefferson High Way Transportation Company. Arthur Helm is the operating manager.

The Eat Shops Corporation of St. Paul has been appointed the official caterer for the airline, which is believed to be the first in the United States to inaugurate this service in air transportation.

WISCONSIN AIR NEWS

FRED HOLTERHOFF, veteran pilot and one time lieutenant in the imperial German air force, has established the second individually owned and operated flying field in Milwaukee County. Mr. Holterhoff's 45-acre tract lies just six miles north of Milwaukee, on a trunk line highway. Students under Mr. Holterhoff are to receive their shop training at the shops and hangars on the field.

The American Eagle company has awarded the sales agency for that district to Mr. Holterhoff.

Esline Hangars Popular

THE Esline Company of Milwaukee has recently installed hangars at the Sheboygan Airport, Sheboygan, Wisconsin, and at the Marshfield Airport, Marshfield, Wisconsin. The hangar at Sheboygan was erected for A. W. Sommer on his 80-acre tract. Mr. Sommer is using a Waco OX5 job, and a Swallow for passenger and taxi work. The field at Marshfield is operated by Berghammer & Dickof who do a taxi and passenger business, and maintain a flying school.

Mr. Kohler, Republican candidate for governor of Wisconsin, also recently purchased an Esline hangar for Kohler Field at Kohler, Wisconsin. This field, when completed, will receive a class B, Government rating. The Ryan and the Travel Air, which Mr. Kohler owns, have been great assets in his political campaign.

The Esline Company will soon erect a hangar for Mr. Neal Norris who owns a Hamilton all-metal cabin ship and a Travel Air. Living on a farm twenty miles distant, Mr. Norris flies to and from his office in Milwaukee.

The Milwaukee County Airport recently enlarged its field by acquiring an additional 136 acres. The Milwaukee County Board of Supervisors plans to lease hangar space to private individuals and corporations.

Wisconsin Aircraft Show

WITH coöperation of the Milwaukee Association of Commerce, an aircraft show will be held in conjunction with the Wisconsin State Fair, August 27 to September 1.

Elling O. Weeks, president-treasurer of the Weeks Aircraft Corporation, has been named director of this new feature of the fair. Other members of the committee are: Stuart F. Auer, Thomas F. Hamilton, Jerome C. Dretzka, Rudolph Hokanson, Assemblyman Henry A. Staab and George O. Hoehn, secretary of the Association of Commerce.

Milwaukee's Air Mail Celebration

MILWAUKEE'S unique celebration of the inauguration of the five cent air mail rates resulted in a record volume of air mail for August 1 and further focused the attention of the public on the efficiency of the air mail. Three times the usual poundage of mail went out that day.

A dozen airplanes circled over the business section of the city each noon for three days preceding the day of the new rate. On August 1 two of the planes, both Fairchilds, one belonging to the Wadhams Oil Company and the second to the Weeks Aircraft Corporation, with wings folded back and propellers whirling, taxied under their own power down Wisconsin Avenue to the Post Office for the city's first consignment of 5-cent air mail. Capt. Leslie G. Mulzer was at the controls of the Wadhams plane and Edgar La Parle piloted the second ship. The planes carried postal authorities and members of the Association of Commerce and the Milwaukee Advertising Club, under whose auspices the celebration was held. The Postman's Band preceded the ships, which were guarded by ropes.

At the postoffice Peter Piasecki, postmaster, loaded the Weeks ship, which had been designated as a reserve air mail plane, with the first batch of mail sent out under the new rate.

Still under their own power, the ships taxied to Maitland field, the municipal airport. With Mr. Piasecki, Harry J. Bell, executive director of the Association of Commerce and two other A. of C. members, the reserve air mail ship took off for Chicago to meet the east and west-going mails.

GOVERNOR ZIMMERMAN toured the farms of Wisconsin in an airplane campaign recently. Several hundred farmers were addressed during his week-end aerial journey of some 600 miles. In the Fairchild plane of the Weeks Aircraft Corp. with the Governor were Mr. and Mrs. Elling O. Weeks and Geoffrey Willoughby of the Association of Commerce.



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OHIO AIR NEWS

By T. E. Lunsford

OHIO'S progress in the field of aviation, both in the manufacture and operation of airplanes, will be shown in the aircraft exposition included as a feature of the Ohio State Fair, August 27 to September 3. The commercial aspect of aviation will be emphasized rather than the military, which dominated last year's displays.

THE Wright Memorial Association for the furtherance of the plan for erection of a national memorial to the Wright Brothers which would be placed in Dayton, is to be formed by a group of Dayton business men some time in September.

WITH more orders ahead than they can hope to fill for the next four months or more, the Vulcan Corporation, Portsmouth, manufacturers of the American Moth monoplane, has swung into active production. The company expects to be producing from three to five planes a week in September.

MAYOR C. C. CURTIS has vetoed an ordinance recently passed by the City Council for the issuance of $100,000 in bonds for the purpose of building an airport at Canton. It was the second time within the space of a few months that Mayor Curtis has blocked the council's plans for an airport by wielding the veto ax.

PERMANENT organization of the Ohio Commercial Operator's Association was made at a meeting of the aircraft and accessory manufacturers of Ohio held recently at Columbus. Luncheon for 50 commercial aircraft operators and others interested in aviation was arranged by Ross Herris, president of the Ohio Airways Transit, Inc., operators of the Columbus field.

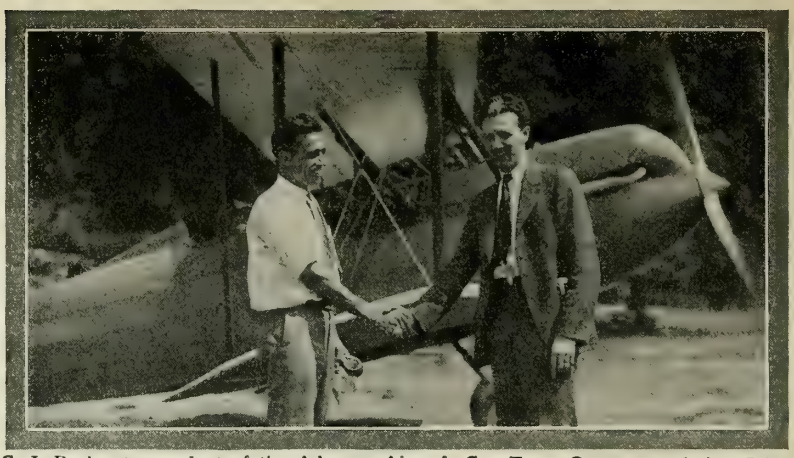
MAJOR HUGH WATSON, head of Watson Airport, Cincinnati, has purchased a trimotored Ford monoplane. The plane will be used to carry pleasure-riders and eventually will be put on a passenger route contemplated between Cincinnati and Chicago.

Seat Covers for Airplanes

THE Cincinnati Auto Specialty Company has forwarded what is believed to be the first set of seat covers ever put on an airplane to the International Aircraft Corporation at Ancor, Ohio, near Cincinnati. The first plane to be equipped with their Biltmore aircraft seat covers was an International five-passenger plane.

According to Mr. A. W. Connor, president of the Cincinnati Auto Specialty Company, the company, which has been making automobile seat covers for the past twelve years, is now preparing to take an active part in providing airplane seat covers for the further comfort and convenience of those who travel by air. These covers are made of Biltmore aircraft cover fabrics, tailored to fit.

WEEK-END passenger service between Detroit and Cincinnati was inaugurated July 28 by the Embry-Riddle Company and the Stout Air Services, using Ford three-motored planes.



C. J. Brukner, president of the Advance Aircraft Co., Troy, O., congratulating John Livingston, president of the Midwest Airways Corp., Waco distributor for Illinois and Iowa, on taking delivery of his 100th Waco.

The plane leaves Detroit Saturday afternoon and reaches Cincinnati about three hours later. Returning, it leaves Lunken airport at 9:30 Monday morning. Fare each way is $35, and the round trip $65.

During its stay in Cincinnati, the plane is flown on day and night trips over the city from Lunken airport.

THE United States Electrical Tool Company, Cincinnati, has recently made T. H. Scaffe district manager of its Detroit branch, and R. N. Brayer has been added to the personnel of this branch. Mr. Scaffe has been connected with the Detroit Branch for some time and Mr. Brayer was previously with the Boyer-Campbell Company, jobbers of that city, for a number of years.

THE Ohio Aero Manufacturing Company, of Youngstown, Ohio, is specializing in the output of monoplanes—the Air Coupe, and its larger sister ship, the Air Master. In addition to this, the company is operating an airplane mechanics' school.

The school is operated on a factory basis. That is, the classes are really factory shifts which put into reality the problems taught. The chief aim of the institution, the production of its monoplanes, is used as the basis for this study, and the students, under a corps of competent instructors, make and put together the various parts of airplanes. The school runs 12 class periods a week, some during the day and others at night. Each student has three classes a week.

Directors of the school and company include L. W. Dunning, C. A. Cochran, Hugh Hamilton, B. A. Millikin, Warren P. Williamson, George R. Clegg and Jud Yoho. Instructors at the school are: Wayne Miller, D. P. Ziegler, John S. Besurck, R. B. Shugart and R. B. Smith.

AN information bureau on air travel, air mail and air express has been opened in the lobby of the Gibson Hotel, Cincinnati.

Through the coöperation of Ralph Hitz, manager of the hotel, the Embry-Riddle company, operators of the air mail line to Indianapolis and Chicago, Miss Maxine Wiegand, is on duty constantly with information on every aerial line in the world.

Defiance-Simplex Airport

THE new 50-acre airport at Defiance, Ohio, opens September 3 with an air circus. The First Army Pursuit Group, stationed at Selfridge Field, will take part in the events.

The Simplex Aircraft Corporation owns and leases 29 acres of the port, and the Defiance Chamber of Commerce owns 21 acres. On the 50-acre tract, to be operated jointly for use of the Simplex company and the public, there is an east and west runway 2,400 feet long with diagonal runways crossing at the center.

The Simplex company's building, located at the field, provides refueling facilities and service for visiting planes.

COMMENCEMENT exercises for the first graduating class of the Embry-Riddle Flying School, Lunken Airport, Cincinnati, Ohio, were held July 29. Although there were only twenty members of the class of '28, their graduation is another important step in aeronautical education.

Stanley C. Hoffman, chief instructor of the school, delivered the commencement address. In his talk, he laid particular stress upon the flier's responsibility to himself and the future of aviation, and the necessity of maintaining highly ethical practices among aviators.

C. A. HARRISON has joined the International Aircraft Corporation as assistant sales manager. He will be in charge of advertising, publicity, sales correspondence and contact between the factory sales office and International distributors.

International Aircraft Corporation is now producing six planes a week at their modern factory in Cincinnati. Production at the present time is being concentrated on the F-17 model which is equipped with any engine from 90 to 220 h.p. Within a short time production on the model F-18, a six-place cabin plane designed for Whirlwind or Wasp engines, will reach three a week.

ON August 4th and 5th the Koolmotor Flying Circus, flying Waco planes, opened the Chamber of Commerce Aviation Field on the Lincoln Highway north of East Liverpool, Ohio.

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CLEVELAND AIR NEWS

By David E. Irwin

TWO new air mail routes, operated by Cleveland companies, opened last month. Continental Air Lines, Inc., inaugurated the Cleveland-Louisville route and the Thompson Aeronautical Corp., its Chicago-Kalamazoo route.

Three planes were required to carry the 1,500 pounds of mail which were flown on the opening of the Cleveland-Louisville line. It was one of the largest consignments of mail ever brought here.

A trimotored ship of the Queen City Air Lines, of Cincinnati, acted as a pathfinder on the first hop and carried Chamber of Commerce, postoffice and city officials of towns along the route.

A large celebration marked the opening of Thompson's route, at Kalamazoo, Mich. Three planes from Cleveland, piloted by Edwin G. Thompson, president of the company, C. P. "Ole" Olsen, and Henry Tallman, flew to the opening.

DEAN C. SMITH, veteran air mail flier on the Cleveland-New York leg of the transcontinental, will be a co-pilot on Commander Richard E. Byrd's Pole expedition.

Smith resigned a few weeks ago from the service of National Air Transport, Inc. He inaugurated the night mail between Cleveland and New York in 1925.

PLANS to construct a $50,000 hangar at Cleveland airport, were announced recently by National Air Transport, Inc. A tentative lease, giving the company a 500-foot frontage was submitted to City Manager Hopkins by Major John Berry, airport superintendent.

The hangar will be 100 by 120 feet. Additional hangars are to be constructed to house three-motored jobs to be inaugurated on the proposed New York-Cleveland-Chicago passenger service.

THE Cleveland-Detroit mail route, operated by the Ford Motor Co., has been discontinued.

THE Stinson School of Aviation of Detroit, operated by Jack Stinson, has opened up a branch in Cleveland.

DUNGAN AIRWAYS, INC., distributors for Waco and Fairchild planes in Ohio, has been given the same territory for Curtiss Robins.

The Dungan company, which also operates a flying school patterned after army lines, has a solution for the problem of getting hours which is faced by all students. H. E. "Hal" Dungan, president of the company, has announced the formation of a flying club to be composed of "flights" of 12 students each. Each flight is to have its own plane and with a comparatively small outlay of money each student can get in his 50 hours of solo work for a limited commercial license.

HALLE BROS. CO., one of Cleveland's leading department stores, recently put on an aeronautic exhibition. Several airplanes were mounted inside the structure and a model of Cleveland's airport was displayed in a window.

Aircraft products and accessories were on display for a week and the leading aviation companies of the city were represented. Capt. Byron G. Cook, director of the ground school of Dungan Airways, Inc., lectured visitors and answered questions pertaining to the displays.

THE Logan Aviation Company of Cleveland has accepted appointment as distributor for the most of Ohio, Kentucky, West Virginia and another state for the American Eagle Aircraft Corporation of Kansas City, Mo.

TOLEDO AIR NEWS

By David E. Hoag

TWO business executives of the American Steel Package Company, Defiance, Ohio, have resigned their posts with that company to become officers in the Simplex Aircraft Corporation. They are E. J. Allen, formerly general manager of the Steel Package Company, and George H. Roberts, its former secretary. Allen will be president of the aircraft company and Roberts will act as secretary.

A factory building in Defiance has been purchased, construction of a new building started and a small force of workmen engaged. Plans call for the construction of one plane a day by September 1.

TWO airplane dealers have established agencies at the Toledo airport: C. J. Fenton, representing the Swallow Airplane Corporation, and H. W. Johnson, International airplane agent.

LYELL K. LEWIS, operator of a chain of gasoline filling stations, has entered the commercial aviation field. He recently incorporated the Lewis Airlines, Inc. Theodore W. Hay is his chief pilot. Equipment at present consists of a Waco-9 and a Buhl.

AKRON AIR NEWS

By Walter E. Burton

AKRON AIRPORT, at Fulton Field, was formally dedicated the evening of August 1 in connection with the opening of the new Cleveland-Louisville air mail line.

A brief and simple ceremony marked the field dedication. Short talks were given by Mayor G. Lloyd Weil of Akron, Lloyd D. Carter, Akron postmaster, and C. W. Seiberling. Pilots of the Continental Air Lines, Inc., who will fly mail planes over the new route, were introduced. They were William McConnell, Jesse Hart, and Rose Arnold.

DEVELOPMENT of a new airport has been started by the Summit Aeronautical Club of Akron. The site of the port is at Copley, near Akron, on the Cleveland-Massillon road.

Six runways are to be provided, and the field is to be lighted by three flood lights, a revolving beacon and alternate red and green boundary lights. Hangars, workshop and a club-house will be built.

S. J. Dinnin is president of the club. A school for fliers will be maintained by the club at the new field, and commercial flying service will be maintained to Cleveland and Columbus.

A NEW low-wing monoplane suitable for training purposes has been built by the American Aircraft Co. of Massillon. The Starwing, as the new ship has been named, has an over-all wing span of 30 feet, a length of 28 feet, and weighs 749 pounds. The power plant is a LeBlond 60 motor, manufactured in Cincinnati. The fuselage is of all-metal frame construction with fabric covering. The wings are of wood with dural spars. Dual controls are provided for the training of pilots.



Thompson Aeronautical Corp., Cleveland Airport



Chambers of Commerce, Holyoke & Westfield, Mass.



Dungan Airways, Inc., Cleveland Airport



Pratt & Whitney Aircraft Co., Hartford, Conn.



Ohio National Guard, Cleveland Airport



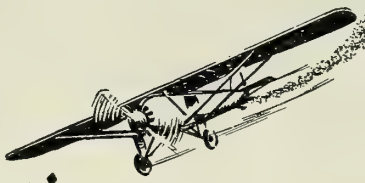
Gray Goose Airlines, Inc., Chicago Airport

Some of the modern hangars designed and constructed by the Austin Company, Cleveland

AIRPLANE PROPELLER PARTS—HUB VALVES, CRANKING NUTS, LOCK WASHERS, CLAMPING RINGS, BOLTS, NUTS, CLEVIS PINS, CONE NUTS, AND ALL FERROUS METAL PARTS ARE PROCESSED WITH—

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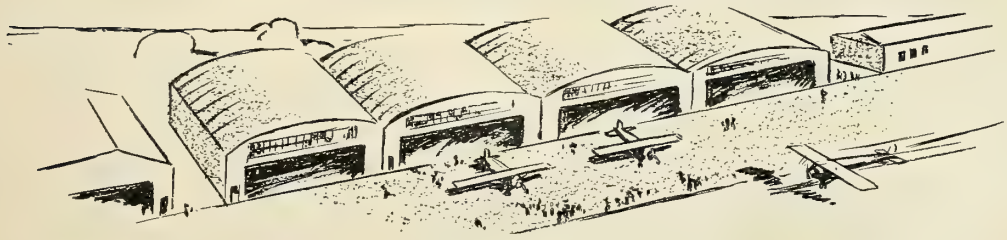
A staff of more than fifty aeronautical engineers is constantly employed by them in development and research work—due to the recommendations of these engineers Udylite is being used on the ferrous metal parts of all Boeing planes.

Engineers who insist on Udylite as a rust proofing agent for airplane parts are planning for the future—because Udylite gives long life to metal parts which heretofore have had but a short period of usefulness.

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Udylite job shops are established in all the principal cities, making its acceptance a convenience to airplane and parts manufacturers throughout the United States and Canada.

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AIR TRANSPORT AND THE INDUSTRY IN FIGURES

Information compiled by the Aeronautics Branch, Department of Commerce, as of July 15, 1928

Air Mail Lines

17 Contractors operating.
25 Lines in operation.
33 Lines in operation and to operate.
10,816 Miles mail lines operating.
14,909 Miles mail lines operating and to operate.
24,950 Miles flown daily with mail.
33,136 Miles flown daily with mail and to be flown.
1,654,165 Pounds mail carried 1927 including 3 foreign lines.
1,449,364 Pounds mail carried 1927 on internal lines.
1,065,498 Pounds mail carried 1927 on internal lines by contract.
$2,561,268 Paid contractors 1927 on internal lines.
$2,643,454 Paid contractors 1927 on all lines.
7,974 Trips scheduled 1927 internal contract lines.
$320 Average income per scheduled trip 1927 on internal contract lines.
133 Pounds average load per scheduled trip 1927 internal contract lines.

Non-Mail Lines

10 Operators.
12 Lines in operation.
2,795 Miles of lines operating.
6,350 Miles flown daily.

All Airways

25 Operators.
29 Airways in operation.
37 Airways in operation and to operate.
11,753 Miles of airways operating 1 or more lines.
15,846 Miles of airways operating and to operate.
30,607 Miles flown daily.
38,793 Miles flown daily and to be flown.
$2,201,150 Revenue of 18 of 21 operators, 1927. (1)
$2,151,340 Expenses of 16 of 21 operators, 1927. (1)
$7,053,650 Investment of 19 of 21 operators, 1927.
$1,340,333 Income of 8 profitable lines, 1927. (1)
$956,570 Expenses of 8 profitable lines, 1927. (1)
28.06 Per cent returns on investment of 8 profitable lines, 1927.
$97,097 Airplane loss in air transport, 1927 (11 planes).
5,870,480 Miles flown by air transport operators including Post Office, 1927. (2)
8,679 Passengers carried in air transport, 1927. (3)
$.106 Average passenger-mile rate of 14 operators, 1927.
$.671 Average airplane-mile cost of 15 operators, 1927.
$.545 Average airplane-mile cost of 8 operators, 1927.
$.406 Average airplane-mile cost of 3 operators, 1927.
$.502 Average airplane-mile cost of Post Office, 1927.
$.209 Average airplane-mile cost, transportation only, of Post Office, 1927.
128 Airplanes in service by 19 of 21 air transport operators, 1927.
$1,838,462 Value of airplanes in service by above.
107 Pilots employed by above.
462 Persons total employed by above.
13,594,085 Miles flown by Post Office with air mail 1918-1927 (fiscal year).
15,657,530 Miles flown by Post Office with mail, ferry and test, same period.
9,000,000 Pounds mail carried by air 1918-Nov. 1, 1927; 2,386 pounds lost.

Airports

352 Municipal.
325 Private and commercial.
256 Intermediate (Dept. of Commerce).
62 Army, including National Guard and Reserve.
17 Navy, including Marine Corps.
326 Market auxiliary fields.
665 Proposed airports.

Production

Number of Planes	*Value*	*Total Value All Air Products*	*Year*
662	$8,046,468	$14,372,643	1919
302	4,133,108	7,430,824	1921
587	7,737,069	13,142,364	1923
789	6,673,659	12,775,181	1925
1,186	8,871,027	17,694,905	1926
1,995	14,504,999	21,161,853	1927

Exports (Airplanes, Engines and Parts)

$3,464,526 in 1919.
1,152,649 in 1920.
472,548 in 1921.
494,930 in 1922.
433,558 in 1923.
789,273 in 1924.
783,659 in 1925.
1,027,210 in 1926.
1,903,583 in 1927.

Aids to Navigation

7,698 Miles of airways for night flying, June 30, 1928, with—
1,284 Electric and acetylene beacons.
256 Intermediate fields.
910 Miles of airways with intermediate fields for day flying.
10 Radio weather reporting and communication stations on Transcontinental and Salt Lake City-Pasco airways. Telephone service on other mail airways.
4,000 Miles of equipped airways for night flying scheduled for fiscal year 1929.
41 Upper air meteorological stations, mostly at airports (Weather Bureau).
8 Cities have airship mooring masts.
3 Radiobeacons on Transcontinental.

Miscellaneous

11,753 Miles of airways operating (July 15, 1928), on 25th anniversary of flight.
9,021 Miles of railroads (1850) on 25th anniversary of the railroad.
600 Air service operators listed.
1,400 Concerns and individuals listed in trade directory.
4,393 Licensed pilots and those operating on letters of authority.
3,246 Student permits issued or pending.
4,021 Licensed airplane mechanics or pending.
47 Approved models of airplanes.
4 Approved models of engines.
4,670 Airplanes licensed, identified or with temporary numbers.
69,858,457 People served in trading areas of station stops along 37 airways operating or to operate.
109 Station stops on 37 airways operating or to operate.
18,746,640 Miles flown in 1926 by 585 air service operators.
$18,924,076 Total expenditures by Post Office on air mail 1918-1928.
36,507 Miles airways in Europe, 1927.
12,616,752 Miles flown European airways, 1927.
123 Airways in Europe, 1927.
6,000,000 Kilometers flown 1927 by 6 French transport companies.
15,422 Airplanes received by Army, 1909-1926 (fiscal year) from the industry.
3,398 Airplanes received by Navy, 1911-1926 (fiscal year) from the industry.
$1,896,941,858 Appropriated for Army aeronautics 1899-1928 (fiscal year).
$544,265,060 of above returned to Treasury or not used in aeronautics.
$444,573,213 Appropriated for Navy aeronautics 1912-1928 (fiscal year).
$97,000,000 of above returned to Treasury.
$4,150,000 Appropriated for Post Office aeronautics 1918-1928 (fiscal year).
$3,524,515 Appropriated for N. A. C. A. 1915-1928 (fiscal year).
$253,000 Appropriated Agricultural aeronautics 1921-1928 (fiscal year).
$9,775,850 Appropriated for Commerce aeronautics 1927-1929 (fiscal year).
9,000,000 Pounds mail carried by air 1918-Nov. 1, 1927.
51 Transoceanic getaways 1873-May 30, 1928; 25 successful.
225,000 Miles flown 1920-1928 by one airplane.
20 Aeronautical journals in the United States.
33 World air records held by United States out of 103 established.
20 States have no air legislation.
11 States and territories have the non-regulatory "uniform state law".
14 States require examination of pilots and planes.

All territories and possessions, the District of Columbia and Canal Zone controlled by Federal Act.

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1. *Includes air service operations of transport operators.*
2. *476,301 additional miles flown by 9 transport operators in air service and 297,560 additional miles in ferry and test.*
3. *36,918 passengers were carried in air service work by 9 transport operators and 657 more carried in ferry and test.*



LIGHTING *THE FINISH*

THE 1928 National Air Races and International Aeronautical Exposition, which take place at Los Angeles under the auspices of the California Air Race Association, mark another peak in the amazing progress made by this new industry. The complete permanent lighting installation of the splendid Mines Field, finish of the Air Races, was made by Westinghouse. In addition, the part that the Westinghouse Company is taking in the development of America's aviation will be shown by an exhibit at the Exposition of the following equipment:

Airport Lighting Equipment

Airport Floodlight Projectors
Boundary Lights
Approach Lights
Obstruction Lights
Hangar Lights
Reflectors
Transformers
Motor Generators

Aircraft Accessories

Micarta Propellers
Micarta Control-Wire Pulleys
Micarta Fairleads
Micarta Hinges



Westinghouse Floodlight Illumination



The Southern Cross flew with Micarta Propellers (Micarta Propellers are manufactured for practically every make of aircraft engine)

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ST. LOUIS AIR NEWS

By A. W. League

AIR-MINDED St. Louis has passed a $2,000,000 airport bond issue by a vote of more than 5 to 1 majority. The passage of the bond issue assures St. Louis of an airport that will be the equal of any airport in the United States and in Europe.

The new field will cover 693 acres—more than a mile square. $835,000 will be spent for four runways 200 feet wide and 4,200 feet long. These runways will be hard surfaced—probably concrete—and will assure ships of every size ample room for landing and taking off from any of eight points of the compass, and under the most severe weather conditions. A concrete strip will connect the ends of each runway. This will enable a pilot to taxi his plane to any part of the field without interfering in any way with ships using the runways to take off or land on.

A lighting system has been designed to equip fully the field for night flying. This equipment includes several batteries of floodlights, boundary lights, obstruction lights and lights which will be used to direct traffic on the runways for landings and take offs. A 2,000,000 candlepower rotating beacon has been installed and is now in operation. The control board, power plant and signalling machinery will be housed together in a building located at the west side of the field.

Another major item will be the passenger terminal and administration building which is to include a plane shed 200 feet wide, into which planes may taxi to take on or discharge passengers. A waiting room, restaurant, roof garden, control tower for the field dispatcher and offices for field executives also are included in the plans for the building. This building will be located at the southeastern corner of the field and will mark the main entrance to the airdrome. Nearby will be hangars for the passenger planes and for the air mail ships. Considerable time will be saved in the handling of the air mail from this point as it is over a mile closer to town than the old air mail station.

The north side of the field will be the factory section where the B. F. Mahoney Aircraft Company and the Curtiss-Robertson Aircraft Company are located. This section of the field has been selected for the factory section because of the shipping facilities that are available due to the fact that the Wabash Railroad marks the northern boundary of the field.

The western side of the field has been set aside for the power house and control station. The hangars and office buildings for the various commercial companies and flying schools operating on the field will be located at this section, as well as the hangars and machine shops for the National Guard, the Naval Reserve and the Army Reserve.

$10,000 will be spent for the construction of an administration garage, which will include an elaborate machine shop for servicing and repairing the rolling stock of the field, as well as a fire apparatus; $70,000 for an air service group of two buildings, which will house radio and photographic rooms, control room and locker rooms; $5,000 for a storehouse for explosives, fares and similar material; $35,000 for a similar layout for the Army Reserve Corps; $70,000 for two mail hangars; $50,000 for a hangar to house large passenger planes, and $88,000 for commercial hangars. $20,000 will be spent for rolling stock, including automobiles, tractors, field cars, fire apparatus, etc.

The land to be purchased for the field is to be bought at about $650 an acre, thanks to options gathered by Major Lambert on his own initiative. This price is exceptionally low when compared to the price of $12,000 an acre which Chicago was forced to pay for its field. The low price to be paid for the land assures St. Louis more than $1,500,000 to spend for runways, buildings, grading and drainage, and lighting of the field. As outlined, the budget leaves a surplus of $104,000 a part of which is likely to be held in reserve for unforeseen expenses.

Work on the development of the flying field has already been started.

THE first "Robin" to be completed at the new factory of the Curtiss-Robertson Company, located at Lambert Field, made its initial flight with Major Wm. B. Robertson, president of the Curtiss-Robertson Mfg. Co. at the stick. The results of that first hop and those that followed were most gratifying according to the officers of the company. This first plane will be retained by the company and a second plane, which will be completed in a short time, will be entered in the New York to Los Angeles air races in September. According to Major Robertson, three planes will be turned out weekly until Thanksgiving Day, when it is hoped to increase the production to one each day and to three planes a day by the end of the year.

ART HEMAN has been appointed St. Louis distributor for the products of Berry Brothers, marketers of airplane finishes. His first job was the refinishing of the fleet of planes belonging to the Robertson Aircraft Corporation.

ST. LOUIS is to have another airplane factory next fall. Both open and closed monoplanes, with passenger capacity ranging from one to five persons, will be manufactured by the Parks Airlines, Inc., Oliver L. Parks, vice president and general manager of the concern has announced.

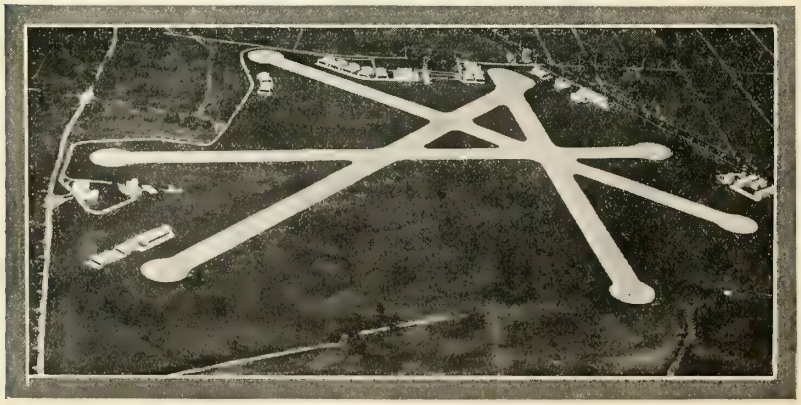
TO augment the equipment already at hand for teaching ground school subjects, Von Hoffmann Aircraft Corporation has ordered a Whirlwind "cut-out" motor. Sewing machines for stitching wing covering, and welding outfits for repairing fuselages, as well as woodworking machines for wing construction and repair, have been added to its school equipment. N. B. Isom, a transport pilot and photographer, John W. Vale, Jr., former Langley Field instructor, and Lt. Linton Roberts, formerly of Chanute Field, have been added to the Von Hoffmann staff.

THE Anheuser-Busch Company, which has been operating a Ryan Brougham piloted by Joe Hammer, has let a contract for a plane which is to be equipped with electric refrigeration. This plane, which is to be used to deliver their products to various cities throughout the country, marks the first step of an enormous aviation program which has been outlined by the company.

THE Parks Airlines have added a Monocoupe to its fleet of ships, which already includes a J4 Stinson, a J5 Travel Air and twenty-one OX5 Travel Airs. The Parks Air College now has 194 students on its enrollment. This school is by far the largest school in this part of the country. A contract for a third barracks has been let by the Parks Company. Ultimately the company plans to have eight hangars, as well as a 75-room hotel for students and visiting pilots.

ORGANIZATION has been completed for the St. Louis Air Transport Terminal Company, a newly formed company, to acquire approximately 570 acres of land just south of East St. Louis, for a new commercial company, giving Greater St. Louis three landing fields, two of them to be capable of accommodating any type of airplane. The new company, which is capitalized at $500,000, has already purchased 420

(Continued on next page)



Model of the new St. Louis municipal airport

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(St. Louis Air News continued)

acres of the land and an additional 120 acres are being held under option. The new field, which is only 15 minutes from downtown St. Louis, will have facilities for accommodating seaplanes as well as landplanes. Four runways will be built—one 7900 ft. long, two 5,000 each and the other 4,000 ft. Each will be 400 ft. wide. Construction is expected to be started soon on hangars, supply shops, administration building and other structures. Plans are being drawn by Phil Love and Preston Sultan of Love-Sultan, Inc., airport consulting engineers.

THE Cardinal Aircraft Company, the fifth airplane manufacturing corporation to be established in St. Louis, has been organized as a subsidiary of the St. Louis Car Company.

It marks a return to that industry by the St. Louis Car Company, a $4,000,000 concern, after an absence of ten years. The corporation constructed 450 planes for the government during the war and had an additional government contract for 220, which was interrupted by the armistice.

Manufacturing tests are now going on in the company's factory in North St. Louis and production is expected to be started in the near future. According to E. B. Meissner, president, the first plane will be on the market in about ninety days.

THE *North Star*, one of the Robertson Aircraft Corporation's new Whirlwind trimotor Ford Stout monoplanes, inaugurated passenger service between St. Louis and Chicago on August 20 with a full passenger list. This twelve-passenger plane leaves St. Louis daily, except Sunday, at 9 o'clock, arriving in Chicago at noon. On the return trip, it leaves Chicago at 3 o'clock, reaching St. Louis at six.

A series of special sight-seeing trips were conducted in order to arouse interest in the ships. Newspaper editors first made a flight as guests of the Robertson Aircraft Corporation. They were followed by Municipal Opera stars and hotel men of the city.

Curtiss "Robin" Distributors

THE Curtiss-Robertson Airplane Manufacturing Co. has retained C. H. Griffin as traveling sales manager. He is now touring the United States interviewing prospective distributors.

So far, the following territory has been allotted to the following distributors: Missouri, Robertson Aircraft Corp., Anglum, Missouri; North and South Dakota, Minnesota and western half of Wisconsin, Air Transportation, Inc., Minneapolis, Minn.; eastern half of New York State including Long Island, Curtiss Flying Services, New York City, N. Y.; southern half of California, Harry Sperl Motor Company, Los Angeles, Calif.; entire export market with exception of Cuba, Canada and Mexico, Curtiss Aeroplane Export Co., New York City, N. Y.; eastern and northern part of State of Wisconsin and Northern Michigan, Richard Lutz, Oshkosh, Wis.; Ohio, Dungan Airways, Inc., Cleveland, Ohio.

KANSAS CITY AIR NEWS

By H. H. James

A BOND ISSUE of $1,000,000 was voted by the people of Kansas City for the purchase and improvement of an airport.

The Kansas City municipal airport will be the airport now operated by the city under a lease and located "in the bend" of the Missouri River, just north of Kansas City. It contains 687 acres. The city will pay $892,000 for the field. Improvements will be started at once. These improvements, according to H. F. McElroy, city manager, will include an "air depot," modeled after the station on the Detroit field. It will include all modern facilities for passengers, pilots and field officers. Concrete taxi ways also will be constructed and the field better drained and graded. A new concrete roadway will be built to connect the field with the Hannibal bridge, across the Missouri River. Negotiations have been completed for lifting the tolls of the bridge.

Additional hangars will be built on the field as needed. The city already has spent more than $100,000 in improving the field and three hangars now are on the field. It is expected that the government will coöperate in the building of dikes to prevent any overflow of the field in the event of unusually high waters.

The airport soon is to have a short wave radio station for the receipt and transmission of weather reports and information relative to the dispatch of mail planes. The station, one of several being installed on the Chicago-Kansas City-Dallas air mail route, is being installed by T. C. Gale, radio engineer of the Department of Commerce, and E. W. Proctor, engineer for National Air Transport, Inc., operator of the air mail service over the section to be served by the stations.

A NEW light that is expected to be a big boon to planes making night landings, has been perfected by Edgar Van Vechten, assistant field manager of National Air Transport, Inc., at Kansas City. The light is a T-shaped light, 18 by 8 feet in size, that is placed on a swivel with a fin to make it indicate the wind direction. The light itself is a brilliant red.

HUGH C. GARRETT, inventor and lubrication engineer connected with the Kansas City branch of the Vacuum Oil Company, has perfected a new airplane cam shaft engine which he claims will give more speed, greater simplicity and four times as much power as the present type of engine.

THE Bennett Flying School of Kansas City, part of the Bennett Eaglerock Sales Company, Eaglerock distributors, now has a deferred payment plan whereby the student pays for his instruction after he has been qualified for a license and is in a position to realize something from his investment.

The school has recently taken over leases of five years duration each on the municipal fields of Okmulgee, Okla., Pittsburgh, Pa., and Coffeyville, Kans., which it is already operating as schools and branches of the home field.

H. F. BROWER of Lindsborg, Kansas, has taken a distributor contract for American Eagle airplanes in his territory.

Tri-State Air Lines, Inc., Sioux City, Iowa; Earl Billiter of Dell Rapids, So. Dak. (dealer); M. L. Wearth, Ames, Iowa; Pearson Aviation Co., Roanoke, Va.; Commercal Airways, Ltd., of Regina, Saskatchewan.

M. L. Cunningham of Dayton, Pa., the State Aircraft Corporation of South Bend, Ind., and the Yellow Wing Commercial Air Service, Inc., San Francisco, Calif., are also new distributors for the American Eagle.

American Eagle Production

PRODUCTION of American Eagles has shown a steady increase since the first of the year. The average output of the factory in January was three planes a week; in February, four planes a week; March, five a week; April, nine weekly; and in May, twelve planes weekly. During July twenty-five planes per week were built at the American Eagle Aircraft Corporation's factory at Kansas City.

PORTERFIELD FLYING SCHOOL, INC., graduated fourteen students during July. Twenty new students were added to the list of students enrolled in the school during the period from July 1st to 25th.

Butler Mfg. Co. Building Airplanes

THE Butler Manufacturing Company, Kansas City, is now building an airplane and will incorporate with other interested parties for the production of airplanes. The Butler plant has the equipment to turn out planes in large quantities; it has the skilled men necessary for this work and it has the organization.

"Our plant is very adaptable to the production of all-metal airplanes," said E. E. Norquist, president and general manager of the Butler Manufacturing Company, "specializing as it does in the fabrication of sheet metal products. Our first plane, however, will be a biplane of wood and fabric. Eventually, perhaps, we will manufacture metal biplanes and monoplanes, the former open, the latter of the cabin type with room for six passengers."

The plane now being made has been designed by Waverley Stearman who recently resigned as chief designer of the Swallow Airplane Company of Wichita to accept a similar position with the tentative company at Kansas City. Mr. Stearman is a brother of Lloyd Stearman, president of the Stearman Aircraft Company of Wichita.

The need for airplanes in sales service has been recognized by the Butler Manufacturing Company; it has now an airplane that it is using in the selling of Butler steel hangars. Elmer S. Rodenbaugh is the pilot salesman.

At the present time the Butler Manufacturing Company manufactures sheet metal products of all kinds, steel hangars and buildings, oil equipment of all kinds such as tanks, etc., and products for use on the farm, with factories in both Kansas City, Missouri, and Minneapolis, Minnesota.

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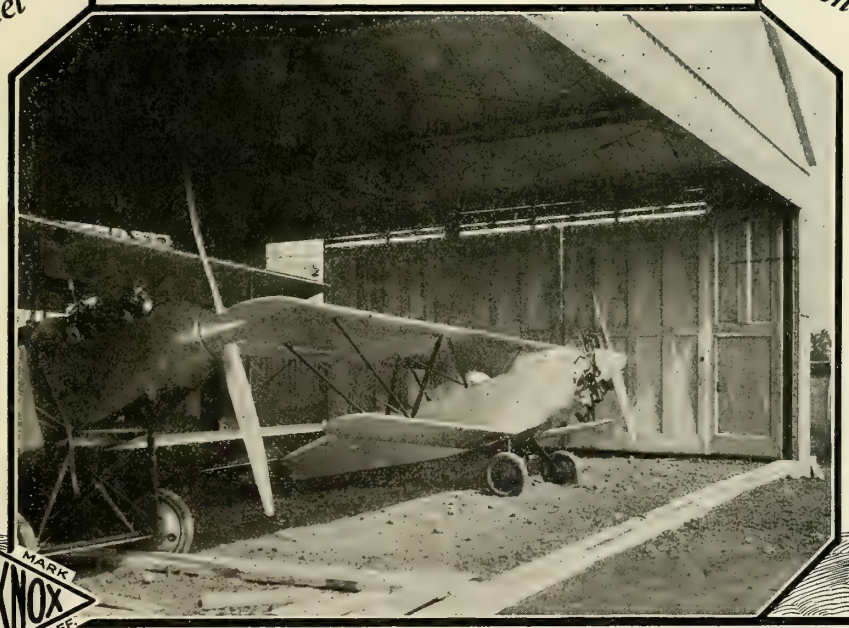
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GLIDER RECORDS

PETER HESSELBACH of Leipsic, of the Darmstadt Academic flying group, on July 26 unofficially broke the American gliding record established in 1911 by Orville Wright who soared for 9 minutes 45 seconds in a box-glider plane over Kitty Hawk, N. C. Taking off from the golf links at Highland Light, Cape Cod, Mass., in the 300-pound glider *Darmstadt,* Hesselbach remained aloft for 58 minutes.

On Corn Hill, Cape Cod, July 29, Hesselbach remained aloft in his Darmstadt glider for four hours and five minutes, a new American record.

On August 11, while staging a demonstration flight for the benefit of J. C. Penney, Jr., of New York, who is promoting the glider sport in America and who brought Captain Roehre, Peter Hesselbach and Dr. Paul Laubenthal here to introduce glider flying in this country, Mr. Hesselbach lost control in a stiff wind and the *Darmstadt* was demolished.

J. C. Penney, Jr., however, has ordered two Darmstadt gliders like the *Darmstadt* for his proposed glider school atop Corn Hill.

Over in Germany, Glyer Kornfeld of Vienna, established a new world's record for gliding flight at the Rhoen contests near Cassel on August 15, remaining in the air for 7 hours 54 minutes.

Soaring is an established sport in Germany. Fifteen thousand persons, men, women, boys and girls, are members of numerous soaring clubs. One German pilot has made a continuous flight of 300 miles in a soaring plane. The altitude record is 2,715 feet.

CONQUESTS OF THE AIR

Record Flights and Flyers

"CONQUEST OF THE AIR—RECORD FLIGHTS AND FLYERS" is the title of a new and most interesting booklet published by the Union Trust Company of Detroit to commemorate the conclusion of the fourth Ford Reliability Air Tour, in which 24 airplanes covered over 6300 miles in 14 states, visiting 32 cities.

The 50-page booklet is a pictorial record of outstanding achievements in aviation. It presents photographs of 54 famous aviators, together with a brief sketch of the achievements that have made each man noteworthy. The booklet is published as a further evidence of the Union Trust Company's enthusiastic endorsement of commercial aviation. The Union Trust owns and operates an airplane, Trusty II. The manager of the trust company's aviation department is Captain Ray Collins, who has just finished serving the Ford Reliability Air Tour for the fourth time as referee. Frank W. Blair, president of the trust company, is chairman of the aircraft committee of the Detroit Board of Commerce.

The first distribution of the booklet was at the dinner attended by over 600 aviation enthusiasts which marked the conclusion of the fourth National Air Tour in Detroit, July 28. A copy of the booklet will be sent to anyone who requests it by writing to the Union Trust Company, Detroit, Michigan.



P. & A. photo.

Peter Hesselbach in his Darmstadt glider at Cape Cod, Massachusetts.

AERON. CHAMBER OF COMMERCE REORGANIZES

THE Aeronautical Chamber of Commerce has reorganized. It has established six aeronautical geographic divisions, each under a vice president, and segregated the membership into national sections, according to specialized interest.

The following officers were elected: president, Major L. D. Gardner, president, Aeronautical Industries, Inc., New York; vice president, Eastern Division, F. B. Rentschler, president, Pratt & Whitney Aircraft Company, Hartford, Conn.; vice president, North Central Division, C. B. Fritsche, vice president and general manager, Aircraft Development Corporation, Detroit; vice president, Great Lakes Division, Col. Paul Henderson, vice president and general manager, National Air Transport, Inc., Chicago; vice president, South Central Division, Walter Beech, president, Travel Air Manufacturing Company, Wichita, Kansas; vice president, Northwest Division, P. G. Johnson, president, Boeing Airplane Company, Seattle. A vice president for the Southwest Division, centering in Los Angeles, will be elected.

J. D. Alexander, president of the Alexander Aircraft Company of Colorado Springs, Colo., was elected vice president of the Commercial Airplane Manufacturers Section; S. S. Bradley, vice president and general manager; L. K. Bell and Owen A. Shannon, secretary and treasurer, respectively.

The Board of Governors was increased from 15 to 21. Others elected, in addition to the president and vice presidents mentioned, are: C. J. Bruckner, president, Advance Aircraft Company, Troy, Ohio; C. H. Colvin, president, Pioneer Instrument Company, New York; S. M. Fairchild, president, Fairchild Aviation Corporation, New York; T. F. Hamilton, president, Hamilton Metalplane Company, Milwaukee; J. D. Hunsaker, American Telephone & Telegraph Co., New York; C. L. Lawrance, president, Wright Aeronautical Corporation, Paterson, N. J.; C. T. Ludington, president, B. B. T. Corporation, Philadelphia; Gen. John F. O'Ryan, president, Colonial Air Transport, Inc., and Chairman of Board, American Airports Corp., New York; H. F. Pitcairn, president, Pitcairn Aviation, Inc., Philadelphia, Pa.; F. H. Russell, vice president, Curtiss Aeroplane & Motor Co., New York; J. M. Russell, president, J. M. Russell Parachute Co., San Diego, Calif.; Walter Varney, president, Varney Aeroplanes, Inc., San Francisco. The twenty-first Governor has yet to be elected.

TICKETS FOR AIRWAYS

WHEN, in the July issue, Don Rose offered to the aviation world his famous 14 points, he covered almost everything of interest to airport operators but tickets.

In any transportation business tickets are essential to proper and business-like control. A carefully planned, accurately numbered ticket system has an indispensable auditing and business control function.

Realizing the need of ticket systems for airways, the oldest company of its kind, the Globe Ticket Company, more than two years ago, began producing special airways tickets of the souvenir variety. An attractively engraved ticket, printed in several colors on non-counterfeitable stock, with three coupons; one for the auditor, one for the pilot and the third and longest section for the passenger as a souvenir of his flight.

The first to use such a ticket was Pitcairn Aviation, Inc. Soon other progressive aircraft companies adopted this ticket and found that it was good—for it gave them control value with advertising value. These tickets produced such an immediate response wherever shown that the Globe Ticket Company recently designed a stock engraved form to be used over any of their stock protective tints, especially for airways customers. No extra charge is made for this stock engraving, hence the cost is reasonable and far below what it would be if one were to go into the market and have a design drawn up for engraving.

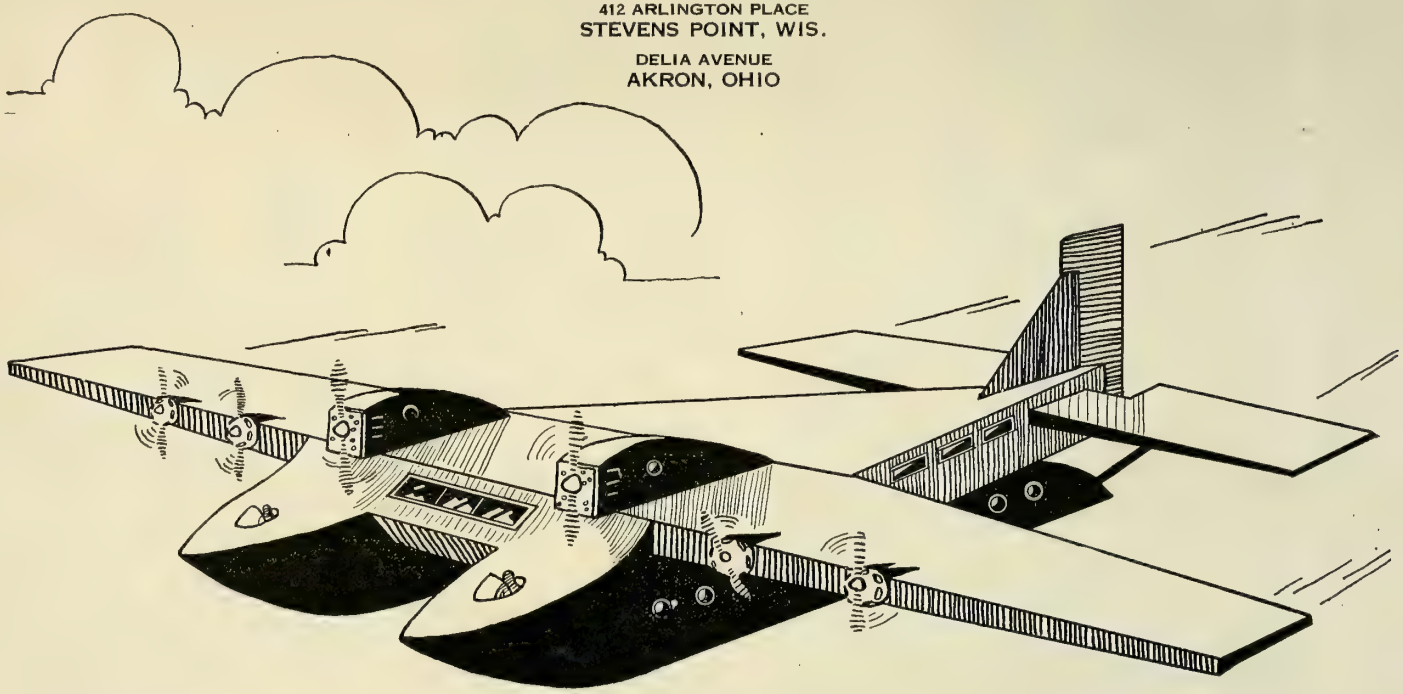
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All Metal, Double Hulled Airseaplane. Single and Tandem Arrangement on greater expansion of wing surface. Double Hull introduced by Wm. R. Gilbo as well as the superimposed cabin space. Conventional Step Hull. Construction of ship in Europe beginning Sept. 1st, 1928.

Say you saw it in AERO DIGEST

NEW ENGLAND NEWS

By G. W. Hamblin

"COME to Boston, the air-minded city." Such will be the slogan in a few weeks, if we are to take seriously the signing of the Boston Airport lease, and Mayor Nichols' threat, promise or declaration to spend $250,000 in two years on this area of filled land.

EDDIE O'TOOLE, president of the Associated Aircraft, accompanied, aided and abetted by his able assistants Bill Kerns, Ray Green, pilots Harold Crowley and Russell Robertson, Miss Helen O'Toole and "Dickie", the office boy, with a slight assistance by the writer, succeeded in staging one of the most successful air meets that the writer has ever attended, at his airport at Martha's Vineyard, August 4 and 5. This was a meet that was planned as purely a commercial venture. Passenger carrying was the prime motive, with enough races, chute jumps, etc. to make it interesting to the spectators. Eddie's Martha's Vineyard airport was officially dedicated at the same time.

A word about the Martha's Vineyard Airport—it is the largest natural airport we've ever seen, and as Eddie claims, it is the largest airport east of the Mississippi. One has a runway in any direction of over a mile, and with a bit of levelling on some dirt wagon roads, the largest and heaviest trans-Atlantic planes could get off with ease. On the east side runs a line of telegraph wires, but these are going to be put underground, and that will eliminate the only hazard that amounts to anything. Visiting pilots are always welcome, and gas and oil and facilities for any repairs are available.

To get back to the meet, planes from Hartford, Worcester, Manchester, Dennison at Atlantic, Hyannis, Boston, Dighton and Webster were checked in. To be explicit: P. H. Spencer, Waco, New England Aircraft Corp., Hartford, Conn.; Irwin K. McWilliams, Fairchild, same company as Spencer, Worcester; George G. "Scotty" Wilson, Waco, New Hampshire Air Service, Manchester, N. H.; Capt. Albert Edson, Challenger, Dennison Airport Corp., Atlantic, Mass.; Bob Ayling's Fairchild from Hyannis; Tom Croce, Challenger, Boston; Harold Christenson, Waco, Boston; George Watkins, Harry King's Travel Air, Boston; Dick Ingalls, Waco, Carl Gordon's airport at Dighton, Mass.; Felix "Breezy" Brisbois, American Eagle, Webster, Mass.; Maj. Chas. Wooley, M.N.G., O-17; Lieut. C. S. Shankle, M.N.G., Falcon; Lieut. Frank C. Crowley, A.C.Res., De Havilland; Lieuts. Robert L. O'Brien, J. G. Hester and Van Arsdale, Consolidated P.T.'s; Alfred Desjardins, Waco, Worcester Flying Club, and Jimmie Whittall, Waco, Ryan-Siemens, Worcester; and Eddie O'Toole's two Wacos. Capt. N. C. Brown, flying Jim Rand's trimotored Ford dropped in for gas Sunday, and created quite a furore with the big ship.

Walter Henry Johnson, of Middletown, Conn., veteran parachute jumper, performed both afternoons. "Scotty" Wilson pulled the stunt of the meet when he took a 91-year old lady up for a hop.

ACCORDING to our friend V. D. Hodge, up at Claremont, N. H., the Claremont Aero Service Corp. has purchased a Swallow plane from Harry Hermann at Springfield, Mass., and has engaged Capt. C. R. Black, late of the Army Air Corps, as chief pilot. The usual flying school, passenger carrying and taxi work will be carried on.

THE Bay State Flying Service, at Boston Airport, took delivery of a Hisso American Eagle, the first Hisso Eagle in these parts. L. A. Williams, Fred Pereira's brother-in-law, has assumed the rôle of operations manager. The Meteorplane owned by Bay State has been set up by Johnnie Polando at Muller Field.

SKYWAYS, Inc., pulled a fast one during the month by putting one of their Monocoupes on Edo pontoons. This is the first time that a Monocoupe has been equipped for water flying, and according to Ted Kenyon, president of the company, the little ship performs very well.

THE Boston Airport Corp., ever forging ahead, took delivery of a Loening Amphibian, and B. F. Billings ferried it up from New York. The "Duck" is powered with a Pratt and Whitney Hornet, and my, oh, my, how she do perform!

H. SAINT JOHN SMITH, of Portland, Me., paid us a visit in his C-6 Travel Air, and all the boys cast envious eyes on that ship of his. "Smitty" is having a lot of fun with the plane, and promises to buy another one when this one wears out. He's got a field at Portland on his estate.

HARRY COPLAND, of Interstate Airways, Inc., of Hartford, says that business is going along nicely, and his hangar, the largest at Brainard Field, is filled with ships. He is flying Travel Airs, and, according to inside info, has a surprise for us all in the Spring.

ONE never knows what these aviators are going to do next, and to prove that statement, here's New England Aircraft, of Hartford and Worcester, with thirty-eight Wacos sold this year. They are New England distributors of the ship.

DENNISON AIRPORT CORP., at Atlantic, Mass., has finally secured a dredge, and is filling in the swamp. A dike has already been built, and when the dredging operations are completed, two runways 2,200 feet will be available. Night flying equipment will then be installed, and Harold Dennison and his boys will have a real airport.

Al Sherman and Lieut. Julian Dexter are doing most of the flying, along with Capt. Edson. Maj. Charles Wooley is now in the corporation, and he reports that things are going O.K. with about twenty-five students enrolled.

DICK INGALLS has gone with Carl Gordon at Dighton, and Leo Tracy has taken his place at Prior's airport at South Easton, where Rollins Aerial Service holds sway.

RALPH T. WICKFORD, chief pilot for the Boston Airport Corp., is continuing his stay at Nantucket, with regular trips from Boston down every Friday and up every Monday. "Wick" says business is good.

THE Springfield Airport Corp., with Edgar Stone as operations manager, is feeling the effects of the five-day air meet they had over the Fourth of July, with a steady stream of students signing up every day. Springfield is lucky with three airports —Fisk Park, Agawam, where Mass. Airway hangs out, and Dunn Field, where Harry Hermann carries on the Springfield Airways.

NOW, in closing, I want every airport in New England represented in these columns. If any of you boys see anything that might prove of interest to us all, send it to me, and I'll gladly use it. This goes to all the commercial operators all over New England.

Springfield Aviation Show

AN aeronautical exhibit will be part of the Eastern States Exposition in Springfield, Mass., from September 16 to 22, inclusive. The outstanding types of airplanes and aircraft engines; a model airport and airport lighting equipment; a complete air mail exhibit including charts, routes, a postal station, etc.; safety devices; a motorcycle courier van used to supplement the air mail service to points accessible to regular routes; aerial photographs; and various aircraft products made in New England will be exhibited.

A special committee has been organized to plan and arrange the aviation show and attendant programs. This is composed of A. J. Guffanti, a former army aviator and member of the Springfield Flying Club, as chairman; Winsor B. Day, president Springfield Flying Club; Frank Wyckoff of the same organization; Lieut. H. D. Copland, pilot, Interstate Airways of Hartford; Benjamin Pollot, traffic manager, Colonial Airways, Hartford; Guy E. Moran, president, Interstate Airways; H. M. Parker, president, Massachusetts Airways, Inc.; Winthrop Sargent, inspector, Aeronautical Division, Department of Commerce; Lieut. Comdr. Herbert J. Grassie, U. S. N.; Capt. S. J. Raymond, U. S. A.; A. B. Reynders, works manager, Westinghouse Electric & Manufacturing Company; Congressman Henry L. Bowles and Charles B. Witney, Harry G. Fisk, George E. Williamson, Robert J. Cleeland, Robert W. Mitchell, Charles A. Nash, Milton Danziger and J. H. Fifield, representing the Eastern States Exposition.

Keene, N. H., Airport

THE Keene, N. H., airport, designed and constructed by Keniston, Inc., of Concord, will be ready for use and will be officially dedicated on September 1. An air pageant has been planned for this occasion.

The Governors of the Six New England States
Invite you to attend

The Third Annual
New England Aviation Exposition



Mechanics Building, Boston

October 1-6, 1928

Sanctioned by the Aeronautical Chamber of Commerce of America, Inc. Endorsed by the National Aeronautic Association of the United States.

Under the management of Daniel Rochford, aviation editor of the Boston Evening Transcript and manager of the December, 1925, and September, 1927, aviation expositions at Boston.



Advisory Committee

Governor Alvan T. Fuller of Massachusetts; Governor Ralph O. Brewster of Maine; Governor Huntley N. Spaulding of New Hampshire; Governor John E. Weeks of Vermont; Governor John H. Trumbull of Connecticut; Governor Norman E. Case of Rhode Island; Assistant Secretary of the Navy for Aeronautics, Edward P. Warner of Cambridge; President Porter H. Adams of the National Aeronautic Association of the United States, of Brookline; Major General Preston Brown, U. S. A., Commanding First Corps Area; Rear Admiral Philip Andrews, U. S. N., Commandant First Naval District and Major General John F. O'Ryan, president of Colonial Air Transport, Inc.



For further information write Daniel Rochford, P. O. Box 66, East Boston, Massachusetts

HARTFORD AIR NEWS

By Ruth W. Hummel

A "HORNET" engine with a reduction geared drive will be exhibited by the Pratt & Whitney Aircraft Company for the first time at the coming Aircraft Show to be held in Los Angeles. These engines are now in production and are being used both in military and commercial work, the Navy having received six, and the Boeing Air Transport Company two.

THE Aero Club of Hartford, which is the oldest chartered flying club in the United States, being founded October 6, 1908, is at present conducting a drive for new members. The Club which has been inactive for the past few years has adopted new by-laws which establish a flying division and a ship has been ordered.

The following officers were elected recently: president, Lester B. Scheide; vice president, Benjamin A. Pollett; secretary and treasurer, Hiram Percy Maxim. The Board of Governors comprise the following: Hon. John H. Trumbull, Governor of Connecticut; Hiram Percy Maxim, Francis T. Maxwell, Charles B. Whittelsey, Edward N. Allen and Captain C. M. Knox.

THE L & H Aircraft Company has announced the elections of Lieut. Carl A. Dixon as assistant secretary and operations manager, and of Major T. W. Campbell as secretary to fill the vacancies caused by the regrettable death of Lieut. Osmond Mather who was killed in an airplane accident near Providence in July.

A VOUGHT CORSAIR was recently delivered at Brainard Field to F. B. Rentschler, president of the Pratt & Whitney Aircraft Company, the plane having been flown up from Mitchel Field by Temple Joyce, sales manager of the Chance Vought Corporation. Mrs. Rentschler was taken as a passenger on the first flight and Mr. Joyce demonstrated how well the plane flew by taking her up 12,000 feet in slightly less than ten minutes. The officials of the Pratt & Whitney Company will use the plane for cross-country flying.

The Pratt & Whitney Company has leased an additional plot at Brainard Field upon which to erect a brick and steel hangar 100 feet by 100 feet.

THE NEWARK AIRPORT

THE municipal airport at Newark, N. J., is rapidly nearing completion and will be formally dedicated during September. This will be the principal air mail and passenger terminus for Greater New York and the metropolitan section of North Jersey.

National Air Transport, Inc., operating the New York-Chicago route; Pitcairn Aviation, Inc., operating the New York-Atlanta air mail service; and Colonial Air Lines, Inc., which has the New York-Boston contract, on October 1, will load and unload their planes at the Newark airport. The change from Hadley Field to the Newark airport will result in a great saving of time in the distribution of air mail for New York City and surrounding cities.

Upwards of a million dollars has been spent by the city of Newark in the building and equipment of the first unit of this big flying field, the construction of which was ordered by Mayor Thomas L. Raymond less than a year ago. This first unit covers about 150 acres. A second unit, to be ready for use next spring, will add another 150 acres to the field.

The Newark airport adjoins the municipal docks at Port Newark, on the shore of Newark Bay, between Newark and Elizabethport. With the completion of state highways under construction, the airport property will have an extensive frontage of the principal automobile highway between Camden and Jersey City, and will be but twenty minutes from lower Manhattan.

Licensed by the Department of Commerce, the Newark airport will be governed by the rules and regulations of the government, and all pilots, mechanics and others using the field will be required to hold government licenses. Strict local regulations will be enforced against low flying, stunting and other practices which might be dangerous.

The Shore Construction Company, of Newark, N. J., has the contract for the development, and the Macomber Steel Company, of Canton, Ohio, furnished the complete steel requirements for the first 120′ by 120′ hangar, built of brick and steel. As time was the essence of the contract, the final shipment of the steel for this first hangar was completed a little over one week after the order was received at Canton and the steel was erected complete within one week after its arrival at the site.



The first commercial Vought "Corsair," owned by F. B. Rentschler.

NEW JERSEY NEWS

By J. B. Bailey

THE Unger Aircraft, Inc., has taken over the commercial rights to Hadley from the Reynolds Airways. Unger has the cross-country and sales privileges while Eastern Air Services has the passenger-hopping right. In addition Unger has taken over the sales for the D. H. Moth.

Eastern Air Services was recently formed by C. E. Truby. Two OX5 Travel Air biplanes were purchased from Unger and in the first week of operation 124 passengers were carried.

SAMUEL YAWITZ and Bernard Havel of Newark have organized the Advance Airways, Inc., to operate a flying service and school near Newark. Two sites are under consideration at Springfield and West Orange.

ATLANTIC AIRCRAFT has expanded again to meet the increase in orders. Additional floor space for assembly work was made available with the acquisition of the Old Brighton Mill in Passaic. This gives them a total of 64,000 sq. ft., exclusive of the main factory and hangar, and makes a total of 300 men working on small parts assembly.

THE New York Airways, operating the sightseeing line to New York City from Teterboro, opened up a new service to Saratoga, N. Y. A trimotored Fokker, with D. D. Johnston at the stick, makes a round trip daily, leaving Teterboro at noon and arriving at Saratoga at 2 p. m. It leaves Saratoga after the races at 5:30 p. m. and arrives back at 7:30 p. m.

THE Super-Universal Fokker, which is to be used on the Byrd Antarctic Expedition, arrived at Teterboro August 11th, after completing a 10,000-mile tour of Mexico and the United States. Grissom E. Haynes was the pilot.

NORTH EASTERN AIR TRANSPORT, organized by Jack Ashcraft, is operating between Hoover Field in Washington D. C., and Teterboro. Two snappily painted Waco-10s are used.

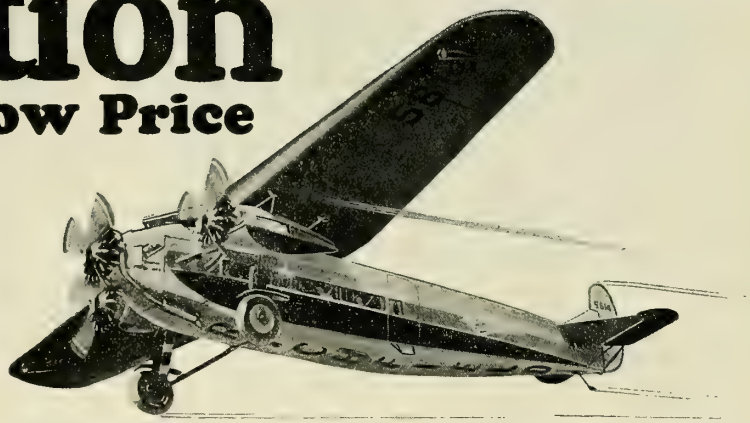
ANOTHER new transport company has been formed by Harris Nevins, bus operator, to be known as the Nevins Air Lines. He is at present offering a combination bus and airplane ride from Jersey City to Kingston where his flying field is located. Two OX5 American Eagles are being used for the passenger-hopping.

THE New Jersey and New York Air Transport of Sea Girt was formed recently by Charles E. Ramsgate to carry on a passenger service between New York City and the Jersey shore resorts. They are using an OX5 Waco-10 with George Thomplinson doing the piloting.

THE Canvas-Leather Specialty Company, makers of Snappy-Snug flying clothes, helmets, face masks, wind cones, etc., are now established in their new building at South Broad & Dye Streets, Trenton, N. J.

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"I don't see how you can sell the course so cheaply and have it as thorough and complete as it is. Have my own ship now and have been flying three months. I flew an Eagle-rock at Wichita Falls and I could fly it in the air the first lesson I took".—GEO. R. POLLARD, Lawton, Okla.

"Your section on Navigation, Meteorology and Flying are each worth the price of the whole course alone".—BOB RIDENOUR, Omaha, Neb.

"Everything in your course can easily be understood by anyone, and is better than some costing twice as much elsewhere. The fundamentals involved are, by far, better than any other I have ever studied". —FRANK BREWER, Buhl, Idaho.

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NEW YORK AIR NEWS

THE 1928 Intercollegiate Air Race for the Loening Trophy has been postponed to December 1. It will be held at 2:00 p.m. at Mitchel Field, Long Island. The postponement was granted in order to provide additional time for flying organization under the direction of the various college flying clubs which will compete.

The Intercollegiate Race will be for speed in attaining one mile of altitude. Each college flying club may be represented by a team of three pilots. For eligibility the student cannot be engaged in commercial flying activities or in active duty in the military services.

GENE TUNNEY, heavyweight champion of the world, on his flight from Speculator, N. Y. to New York City was insured for $300,000; and the dual-motored, ten-passenger Sikorsky Amphibian in which he made the flight was covered to the extent of $30,000. This insurance, which was placed through Barber & Baldwin, Inc., aviation insurance underwriters, was written at a very low rate of premium.

THE David Bell Company, Inc., of Buffalo, N. Y., manufacturer of automatic screw machine products and heat treated steel products, confines its efforts entirely to the production of special parts to suit customers' drawings or samples. The company has complete heat-treating equipment and metallurgical laboratory, as almost all aircraft parts are now being made from alloy steel. Catalog No. 426 describes and illustrates a number of their products, including special aircraft parts.

THE members of the New Rochelle Flying Club, Inc., operating at Armonk, N. Y., an organization formed for the purpose of student instruction, have been active for the past two months.

The club is at present using an Alexander Eaglerock plane of the old design and has ordered a new center section Eaglerock powered with a Curtiss OX5. Captain P. Barb is the club's instructor. W. H. Herring, of 138 Hillside Ave., Mount Vernon, N. Y., is the secretary.

CAPTAIN EMORY S. LAND, Construction Corps, U. S. N., has been appointed to the office of vice president of the Daniel Guggenheim Fund for the Promotion of Aeronautics. Captain Land will fill the office recently left vacant by Rear-Admiral H. I. Cone, who was appointed to the Shipping Board by President Coolidge. The Navy Department has released Captain Land for a period of a year, and he will assume his new functions as soon as he is relieved of his present duties as Assistant Chief of the Bureau of Aeronautics.

THE Argentine Government, through its Naval Commission to Europe, has recently closed a contract with Chance Vought Corporation, Long Island City, for a number of "Corsair" 2-seater observation and fighting planes especially designed for catapult launching from battleships.

The Argentine Commission, after an exhaustive sojourn in the United States to investigate American airplane design and manufacture, has been in Europe for over a year studying the latest military airplanes in use by the various governments there.

The engines to be used in these planes, as in all Vought "Corsairs", will be Pratt & Whitney "Wasp", 450 horsepower, air-cooled. Armament and other military equipment, however, such as radio, is to be of English manufacture.

CONTRACT for the erection of the first steel cote hangar to be built at Mill Basin, Brooklyn, has been awarded to the Guaranteed Garages Corporation. The Brooklyn Air Transport, manufacturers of flying boats with air-cooled motors and high lift wings, will use the hangar. This hangar is specially designed to meet the requirements of the Dock department and of other governmental inspection departments.



Richard F. Hoyt and his new "Cyclone"-engined Loening amphibian air yacht.

THE Atlanta Chamber of Commerce, coöperating with the Junior Chamber of Commerce of Atlanta, the Georgia Society of New York, and the New York Merchants' Association, sent a complete exhibit of Georgia manufactured products by air mail on August 1 from Atlanta to New York for display in the Waldorf Astoria Hotel. This is believed to be the first time that an entire commercial exhibit was sent by air mail.

The display included cotton seed products, soft drinks, a miniature tent, shoes, sweaters, hosiery, overalls, candies, pants, mayonaise, brushes, caps, ties, flour, cotton bags, shirts, twine, manufactured cotton goods samples, wiping cloths, cotton rugs, various kinds of women's dresses, peanut products, pencils and surgical supplies.

THE Martin Travel Bureau of New York City is operating a scenic tour over Manhattan Island, starting from 125th Street and the Hudson River. Five-place, Ireland flying boats are used. The fare, which includes transportation by automobile from the passenger's home or hotel on Manhattan Island, is $12.50 per person.

Air Associates Expansion Program

ABOUT a year ago Air Associates, Inc., put into operation a plan of sales representation founded on modern progressive merchandising principles that was an innovation in the aircraft field.

That their efforts have been met with success from the beginning is now shown by their plans of reorganization and expansion. At the present time Air Associates is eastern distributor for the Lockheed "Vega" and Driggs "Dart". They are American representatives of the "Avro Avian". They are also authorized parts dealers for the Wright Aeronautical Corporation in the eastern territory. In addition to these, they represent a complete line of aircraft accessories and supplies.

The company was recently reorganized and the following officers elected: James B. Taylor, Jr., well known naval aviator and test pilot, president; Haven Page, secretary-treasurer and general manager; F. L. Hill, vice president in charge of sales. The capitalization of Air Associates, Inc., has been increased from $50,000 to $500,000. The board of directors has been increased from five to eleven. Plans call for immediate expansion of operations throughout the entire eastern territory.

ALBANY AIR MEET

ONE of the largest air meets and aircraft expositions ever given in New York State will be held at Albany October 3—6, at the dedication and opening of the Albany Municipal Airport.

Events include air derby to Albany, 40-mile cross-country races for open cockpit planes and cabin monoplanes; dead stick landing contests; civilian parachute jumping contests, etc. Large cash prizes are offered.

The air meet and exposition are sanctioned by the Aeronautical Chamber of Commerce, and sponsored by the Flyers, Inc. Robert Aldrich is general manager.

Once more....

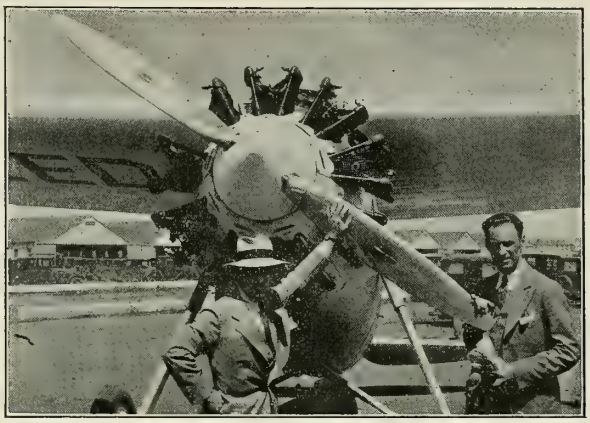
SCINTILLA
AIRCRAFT MAGNETOS
take part in a record flight

A LOCKHEED VEGA, the "Yankee Doodle," with Col. Art Goebel behind a Pratt & Whitney "Wasp" and with Harry Tucker as passenger, established a new non-stop record from coast to coast—2,710 miles in 18 hours and 58 minutes. Scintilla Aircraft Magnetos supplied the ignition on this trans-continental flight, as it has on the numerous Trans-Atlantic, Trans-Pacific and other record shattering flights.

There is a type of Scintilla aircraft magneto for every American-made aviation engine.

SCINTILLA MAGNETO CO., Inc.
Sidney, N. Y.

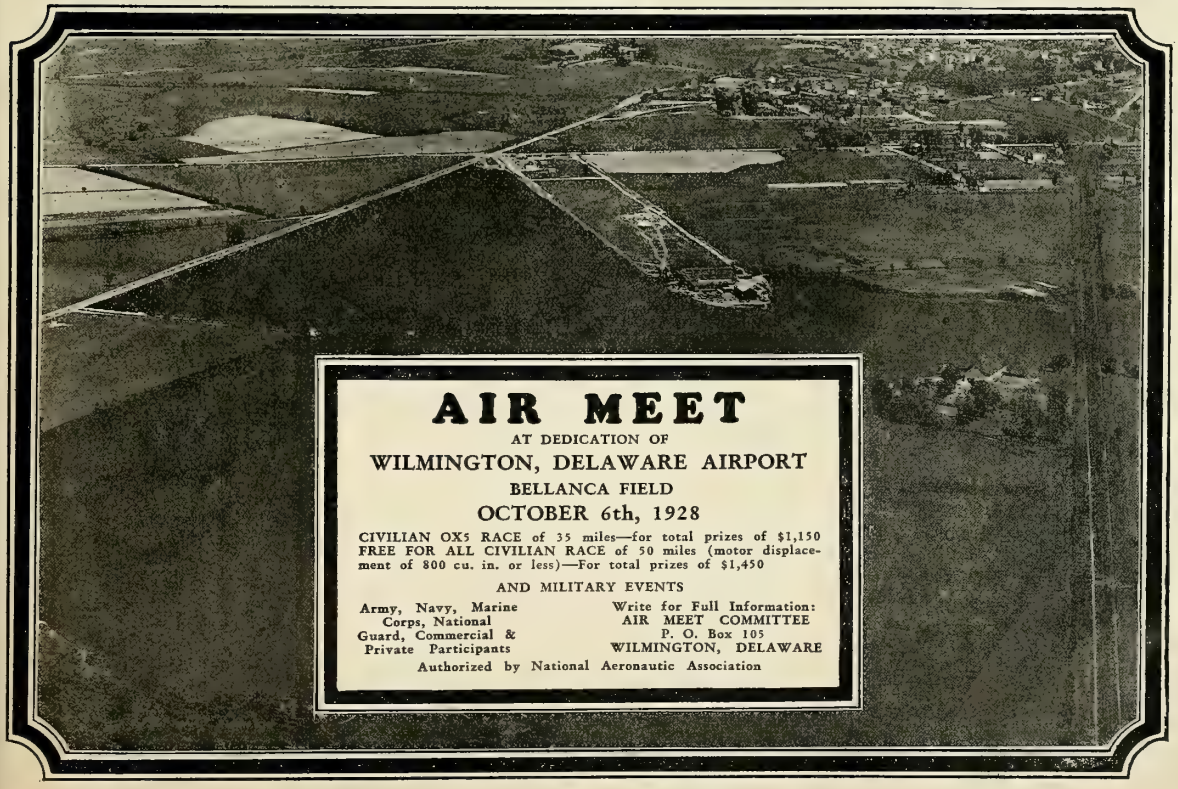
Contractors to the U. S. Army and Navy



ABOVE: The Lockheed monoplane in which Goebel and Tucker broke the non-stop Los Angeles-New York record.

RIGHT: The type of Scintilla Aircraft Magneto with which the "Yankee Doodle's" "Wasp" was equipped.





AIR MEET
AT DEDICATION OF
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BELLANCA FIELD
OCTOBER 6th, 1928

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Authorized by National Aeronautic Association

CENTRAL NEW YORK

By Mildred Marvin

ONEIDA'S new airport was dedicated with a program which attracted 25,000 persons. A sky wedding, a banquet, an air circus and a visit by the dirigible *Los Angeles* were features of the day.

Prominent men, introduced by the toastmaster, Postmaster Jay Farrier at the banquet were: F. Trubee Davison, assistant secretary of war for aeronautics; T. Douglas Robinson, assistant secretary of navy; Colonel MacNider, former assistant secretary of war and a past commander of the National American Legion; Congressman Bertrand Snell, Potsdam; Senator J. Griswold Webb, Poughkeepsie; Mayor Charles Hanna, Syracuse; Mayor Tedd, Rome; Mayor Frederick Rath, Utica; Harry Wilder, past commander of the American Legion.

A 20-mile race was won by Dick Bennett of Binghamton in eight minutes and seven seconds. Joe James of Albany was second, Ted Burke of Albany, third. The stunt flying exhibition was won by Ralph Haynes of Elmira; Jack Grady of Wallsville, second, and Joe James of Albany, third.

FAIR HAVEN recently dedicated its new airport with an air meet.

A SUCCESSFUL two-day air meet was held on the Powers farm one mile west of the City of Auburn, N. Y. recently. Army, Navy and Marine planes took part in this Finger Lakes meet. F. Trubee Davison, assistant secretary of war for aeronautics, flew to the meet in a Curtiss Hawk piloted by Capt. Ira Eaker. A banquet was held by the chamber of commerce in honor of Secretary Davison who was principal speaker of the evening. Congressman John Tabor presided at the dinner. An airport for Auburn was urged.

PENNSYLVANIA NEWS

By Ray Krimm

THE new Lancaster Airport was dedicated during the latter part of July. Between thirty-five and forty planes, accompanied by more than 100 pilots, mechanics and aviation company officials from six nearby states took part in the ceremonies and the two-day air meet.

The meet was staged through the coöperation of the Lancaster Airways, Inc., lessee and operators of the field, the Aviation Committee of the Lancaster Chamber of Commerce, and the American Business Club. Representing the Lancaster Airways, Inc., were Major William D. Grant, president; E. L. Esbenshade, treasurer; Jesse P. Jones, manager of field operations; Rupert E. Herr, pilot; Robert Mussleman, pilot; Larry W. Jacobs, pilot, and Charles Hastings.

Ralph Haynes, of Elmira, N. Y., piloting an OX-5 Waco-10, won first place in four of the five events held for contestants. Val Miner, also of Elmira, piloting a three-place Travel Air, won the 25-mile race for planes equipped with OX-5 engines. Jesse P. Jones, of the Lancaster Airways, Inc., took second honors.

Haynes won first place in the balloon strafing contest, with Gardner Nagle, of Towanda, Pa., second, and Jones third. Haynes also captured first place in the stunt contest, with Jones second. Parachute jumping was demonstrated by Howard Rittenhouse, of Pottstown, Pa.

THE Military Sales Co., Philadelphia, has issued a Pilot's Log Book for free distribution to pilots on request.

THE New Castle Aircraft, Inc., of New Castle, Pa., has been granted a charter by the Pennsylvania corporation bureau. The company will operate a flying field at New Castle. Flying instruction and passenger service will be available.

Orville Brown is treasurer; John S. Crowl and Glenn Latimer also are connected with the new organization.

AT Reading, John P. Wolfinger, chairman of the Aviation Committee of the Reading Chamber of Commerce, has announced that express and passenger service between Harrisburg and Newark, N. J., will be started on Labor Day.

AT Towanda, the Towanda Post of the American Legion has taken charge of the flying field at East Towanda. The airport has been named American Legion Field, with five legion members and four Chamber of Commerce representatives constituting a board of governors to direct the field's activities.

THE Ellwood Aircraft Company, of Ellwood City, has been granted a charter by the State Department for the manufacture, purchase, sale, repair and operation of planes. William F. Keagle is treasurer; C. V. Patton and Kenneth E. Fox are named as incorporators.

THE Williamsport Airport Company and the Battlefield Airways, Inc., have applied to the Public Service Commission, Harrisburg, for approval of charters. Permission has been asked by both companies to transport passengers, personal baggage, mails and freight from both airports to various sections of the state.

The Williamsport Airport Company is establishing an airport at Montoursville, Lycoming county, near Williamsport. The Battlefield Airways, Inc., is establishing a flying field in Cumberland Township, Adams County, near the famous Gettysburg battlefield.

ANOTHER Pennsylvania flying club has applied for a charter—Sunbury Flying Club, whose organizers have secured a lease for a flying field near the center of Sunbury.

Dr. C. P. Lamon, Dr. E. A. Brown, Ammon K. Bateman, E. E. Burghduff, John A. Apple, Robert Bond, Sidney E. Everett, Frederick Hoffa, J. E. Phillips, R. E. Dewitt, S. E. McCarty, R. G. Deibler, L. S. Sober, C. D. Clark and C. H. Pontius are named incorporators of the club. All are Sunbury men.

Air Course at Carnegie Tech.

A NEW course in aeronautical engineering will be given at the Carnegie Institute of Technology, Pittsburgh, Pa., beginning in the fall of 1928, as an "option" in the Department of Mechanical Engineering of the College of Engineering.

The course will offer instruction in elementary aeronautics, theory of fluid flow, theory of airplanes and propellers, theory and design of dirigibles and airplanes. A wind tunnel for measuring the forces exerted by air upon airplane and dirigible models will be installed. Airplane engines and instruments will be available for study and test purposes.

T. H. "DOC" KINKADE has become affiliated with the Lycoming Manufacturing Company, Williamsport, Pa., manufacturers of gasoline engines, and will assume his duties at once.

Kinkade was formerly with the Wright Aeronautical Corporation and many of the engines of the successful planes used in the transatlantic flights last year were made ready by Kinkade. The Bellanca plane, the "Columbia," of Chamberlin and Levine, the Fokker of Commander Byrd, the Stinson plane of Ruth Elder and George Haldeman, were all tuned up by Kinkade before their flights.

THE Somerset Chamber of Commerce have had the name Somerset, Pa., with an arrow pointing north, painted on the roof of the Ferner Hotel building with yellow block letters sixteen and one-half feet high and ten feet wide with a four foot space between the letters. The Airport Committee of the Chamber would be very glad to hear from pilots who fly over Somerset as to how this sign shows up from the air.

WILMINGTON AIR MEET

AN air meet of national interest will formally open the Wilmington, Delaware, Airport on October 6th. This meet will be held under the rules and with the sanction of the National Aeronautical Association. Trophies, individual prizes and $2600 in cash will be offered contestants.

The committee in charge is headed by Henry B. duPont, for a number of years an aviation enthusiast.

The official designation of the Wilmington Airport is Bellanca Field. It is located about six miles south of Wilmington on the Delaware River and affords landing facilities for seaplanes as well as landplanes.

The Bellanca Aircraft Company has established its factory at the field, which is a tract of about 36 acres lending itself admirably as a landing field. One runway has a length of over a mile.

Through an arrangement with the Wilmington Chamber of Commerce, whereby the business body provides the lighting equipment for the field, the Bellanca Company in return has opened the field to the public, naming it the Wilmington Airport, Bellanca Field.

The Bellanca company is now in production at its new plant, turning out a cabin plane every week. This schedule will be increased shortly to two a week.

Phoebe Fairgrave Omlie *and* Her Famous *Monocoupe*



THE only woman flyer in the National Air Tour selected the Monocoupe, powered by the famous Velie five-cylinder, radial air-cooled, aircraft engine, for entry in the 4th National Air Tour.

She knew and was anxious to prove the reliability of the small plane properly designed and constructed and with confidence in the new Velie radial engine, born of previous experience, entered the Tour with the firm intention to finish.

Phoebe Fairgrave Omlie toured in competition with 23 of America's foremost male flyers, whose planes were equipped with motors from four to ten times the power of her Velie M5.

She has demonstrated to the air-thinking people of America as well as to her flyer friends in the Tour, that the Monocoupe's reliability is more than equal to the hazard of crossing for the first time, in a light plane, the Great American desert, and mountains of ten thousand feet altitude and more.

The powerful Velie five-cylinder, radial air-cooled, aircraft engine probably had less attention than any other in the Tour; Phoebe Omlie carried no mechanician nor assistant pilot . . . It is said by America's principal airplane designers, manufacturers and flyers that Phoebe Omlie has proven herself to be a most capable flyer, and the Monocoupe as the ultimate plane for the private owner.

Valuable territory is still available for distributors and dealers. The list price of the famous Monocoupe is $2675, flyaway at Moline, Illinois.

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WASHINGTON, D.C. NEWS

By Sam Barker

WASHINGTON AIRPORT, INC., carried 4,128 passengers during July as compared with 3,226 during June. J. E. Boudwin is chief pilot for the company.

THE College Park Field on the highway to Baltimore was used by early experimenters such as Emil Berliner—Henry A. Berliner's father—and later by "Upside-down" Pangborn. Now it is the scene of the radio beacon experiments carried on by the Department of Commerce. Reserve Lieutenant Donald Stuart is flying the Department's De Havilland with its directional indicator.

FOURTEEN Washington airmen were at Langley until August 11, for their annual flight training of two weeks. Among these reserve officers were Captain Jesse W. Lankford, Chief, Licensing Section, Air Regulations Division, Department of Commerce, and Lieutenant Colonel J. F. Randall.

ELMER CROSS, Washington manager for Pitcairn Aviation, Inc., holders of the New York-Atlanta air mail contract, advises from his office at Bolling Field that there were no engine failures or delays on the line during July; also that there has been a 200 per cent increase in poundage since the reduced air mail rate was effective. On the night of August 4, it was necessary to operate two Pitcairn "Mailwings" to carry the cargo of mail from New York south.

CAPTAIN ARTHUR NESBITT, the efficient and courteous representative for the Fairchild Aviation interests in Washington, is probably the busiest man hereabouts with the possible exception of certain officials of the Aeronautics Branch who are endeavoring to keep up with the demands for licensing men and ships. This gentleman acts as liason officer between the various Government Departments and the headquarters of his firm in New York. Besides handling these multivarious duties he acts as host to many visiting notables.

CAPTAIN JOHN W. DAVIS, JR., American ace with the French Army and later with the old Curtiss Exhibition Company, has been appointed Aeronautics Trade Commissioner to South America. In company with Fowler Barker of the U. S. Bureau of Foreign and Domestic Commerce he is making a tour of the airplane factories in the east and middle west and will sail for his post at Buenos Aires within a few weeks.

MARSHALL S. BOGGS, former Department of Commerce inspector in charge at Detroit, has been transferred to Washington as Assistant to Edward P. Howard, chief of the Air Regulations Division, Aeronautics Branch. Both gentlemen are fliers from away back, and are still active when the opportunity avails to handle the stick.

Gilbert Budwig is back at his desk as chief inspector after a trip in the Department of Commerce Buhl Special Airsedan during which he called upon the various inspectors located throughout the country. J. L. Kinney is now on an inspection trip by airplane.

Mt. Vernon Airways Takes Over Potomac Flying Service

MT. VERNON AIRWAYS, INC., operating Hybla Valley Field at Alexandria, Va., has taken over the Potomac Flying Service, Inc., operators of Hoover Field at Washington, D. C., and will continue operation of Hoover Field under the name of Potomac Flying Service, Inc., subsidiary of Mt. Vernon Airways, Inc.

E. W. Robertson, president of the purchasing corporation, will take charge of the new Hoover Field organization as well as his present operation at Hybla Valley.

Mt. Vernon Airways, Inc., are distributors in Maryland and Eastern Pennsylvania for Alexander Eaglerocks. E. C. Burghduff is sales manager of the Eaglerock Sales Division.

Henry A. Berliner, president of the selling company, well known aeronautical engineer, will devote his time to the Berliner Aircraft Corporation at Alexandria, Va., of which he is president.

The operations at Hoover field will be confined mostly to passenger work while most of the student instruction will be conducted at Hybla Valley. Students are enrolled rapidly. An advertising campaign is being conducted on a large scale and results are very gratifying.

WEST VIRGINIA NEWS

LAWRENCE M. BRILE has been elected president of the Fairmont Manufacturing Company of Fairmont to succeed W. J. Adam, resigned. Mr. Brile was formerly vice president in charge of sales. Dr. Robert J. Anderson was elected vice president and is in charge of production of the company's aluminum rolling mills at Fairmont.

Other changes in the personnel are as follows: John N. Brenza, formerly manager of the Cleveland, Ohio office of the company, becomes sales manager at Fairmont. T. A. Lynch has been appointed assistant to the president.

NORTH CAROLINA NEWS

Bluethenthal Airport

BLUETHENTHAL AIRPORT, which was opened several months ago, is situated about three and one-half miles northeast of Wilmington, N. C., on a naturally level piece of ground. It is an X-shaped field, the two intersecting landing strips being 1750 feet by 230 feet and 1700 feet by 230 feet respectively. No obstructions whatever are on the field and but few skirting the field. The field is marked with a white sand border to each landing strip and the conventional 100 feet circle at the intersection of the strips. Plans are under way to bring a flying service to this field and lights will probably be put in at that time. All planes are welcome to this field where they are sure to find service.

LOUISIANA AIR NEWS

By Harold A. Dempsey

THE Chamber of Commerce of Jennings, La., has announced its intention of petitioning postal officials to have Jennings made an air mail station. An airport has already been constructed in the town and according to H. F. Hart, local manager of the Standard Oil Company's plant, every modern facility is provided. A large sign bearing the word "Jennings" painted in yellow on a black background, with letters eleven feet long has been erected on the roof of the Standard Oil Company's building.

NEW ORLEANS will have one-day air mail connection with Chicago, St. Louis and other cities of the middle west and a two-day service to the Pacific coast within the next six months. The mail will be carried over the new trunk route from Chicago to Atlanta, the contract for which has been awarded to Interstate Airlines, Inc., of Chicago.

Air mail leaving New Orleans has increased 40 per cent since the new schedule of rates went into effect.

THE St. Tammany-Gulf Coast Airways, Inc., has ordered five Fokker Super-Universal planes, motored with Pratt and Whitney engines, for service on the air mail lines operated by them. Four of the planes, according to William De Wald, operations manager of the flying company, will be used on the new Mexico City-New Orleans Line and the fifth on the Atlanta-New Orleans branch. The Mexico City line is scheduled to begin functioning this fall.

W. L. S. GORDON, New Orleans postmaster, was elected president of the Southern Transcontinental Airways Association at a meeting held recently to discuss the installation of air service that would extend from Los Angeles to New York with New Orleans and San Antonio as its main intermediate points.

The meeting was held in San Antonio, Texas, and other officers elected who are residents of that city are: Major J. B. Weaver, vice president and Porter Whaley, secretary.

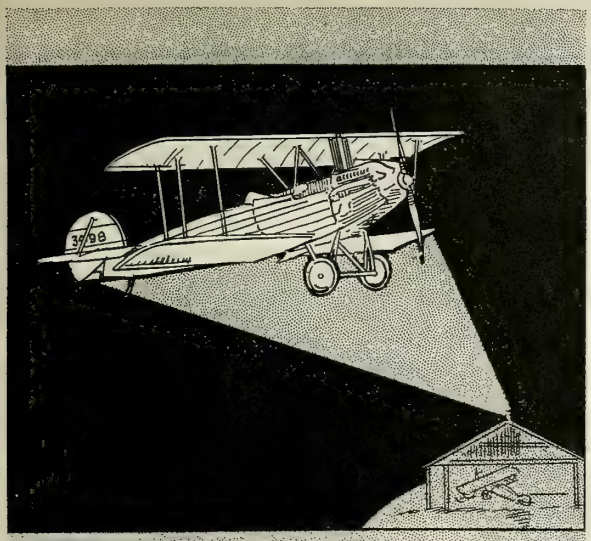
THE navigation beacon known as the Jung Hotel Light has been completed. It is of the revolving type, has a candlepower of 8,000,000 and is visible to planes from a distance of 35 miles from the business center of New Orleans.

MENEFEE AIRWAYS, INC., has established regular sightseeing tour service following the arrival of a new Ryan brougham Wright Whirlwind motored monoplane from California.

The Menefee company is handling Lincoln-Page planes and operating them in cross-country flights. A new class of instruction was begun on August 1.

THE New Orleans Airport Commission has elected Gilbert J. Fortier president to succeed General L. A. Toombs, who has

(*Continued on next page*)



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Aeronautical Chamber of Commerce

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(Louisiana Air News continued)

been assigned to duty with the United States prohibition forces at Shreveport, La. Other directors of the commission are: Edwin O. Cook, S. J. Drapekin, Jacob Bodenger, Paul Freund, Allen S. Hackett, George A. Hero, Jr., Samuel H. Livaudais, Robert Moore, Jr., Max Scheinuk, Commissioner T. Semmes Walmsley, A. Adair Watters, Lewis J. Bourgeois, Gordon W. Callender, Raymond Saal, Marshall C. Callender and I. B. Tribken.

Following his election as president, Mr. Fortier resigned as chairman of the aviation committee of the Association of Commerce. Roger E. Simmons has been appointed to succeed him as chairman of this committee and George Danziger has been named vice chairman.

THE New Orleans Air Line, which for seven and a half years has furnished regular daily airplane service between the port of New Orleans and vessels arriving or departing in the South American and Central American trades, has just completed a new hangar at the junction of the Mississippi river and the inner harbor navigation canal. The company owns 10 Curtiss Seagulls and now has two hangars and two runways at its New Orleans terminus and a runway at Pilot Town. It will construct a fourth runway at Port Eads in the near future.

The new hangar will care for reserve equipment and will afford workshop space for the construction of wings and hulls, which are to be built by the company on its own premises.

SHREVEPORT AIR MEET

By H. H. Copman

AN ably conducted air meet was held at Shreveport on August 5. The meet was sponsored and carried out by the Shreveport Airways, Inc., with the coöperation of the Shreveport N. A. A. chapter. It served to dedicate the airport recently established on the outskirts of Shreveport by the airways company.

Army aviators from Fort Crockett, Galveston, Texas; Brooks and Kelly fields, San Antonio, Texas; Maxwell field, Montgomery, Alabama, and details from observation units at Little Rock, Arkansas and Dallas, Texas were at the meet. The commercial pilots attracted by the several events making up the contest feature of the meet numbered more than thirty. In all, nearly seventy-five planes were assembled for the occasion. Trophies and prizes amounting to $1250 were offered.

The field is on the Greenwood road, leading to Marshall, Texas, and lies about three miles beyond the city limits of Shreveport.

The first event was a 30-mile free-for-all for planes with motors of 100 h.p. or less. It was won by Capt. Wright Vermilya, of Little Rock, in his Command-Aire biplane; time, 30 minutes. Howard Woodall, of Dallas, piloting a Travel Air plane, finished second, in 31 minutes; Erret Williams, of Greenville, S. Car., flying an Eaglerock biplane was third, in 31 minutes 20 seconds.

The second race, a free-for-all for all types of planes, also for 30 miles, was won by the Cessna monoplane of W. T. Ponder of Dallas, in 13 minutes and 30 seconds, or an average speed of about 133 miles an hour. The Vought biplane piloted by A. J. Lanier, of Shreveport, was second; time, 15 minutes. "Reg" Robbins, Toledo, Ohio, in a Ryan monoplane, was third; time, 16 minutes.

Third event was the "spot", or dead-stick landing contest. Vermilya in his Command-Aire tied with Erret Williams in his Eaglerock biplane. Each landed within five yards of the designated spot. Howard Woodall in his Travel Air plane, was second, and Al Schneider, of Indianapolis, third.

Howard Woodall in his Travel Air scored again in the fourth event, which was a "stunt" feature. He was awarded first place for his masterly stunt flying. Merle Brock, of the Southern Airways, Dallas, Texas, in a Swallow plane, secured second place, and Erret Williams was awarded third place.

The concluding event was an altitude race to a height of 2000 feet. Merle Brock, in Lanier's Vought biplane, made the ascent in the shortest time. Curry Sanders, of the Huff-Daland Dusters Company, Shreveport, won second place.

The "On-to-Shreveport" prize offered to the aviator coming the greatest distance to the meet, was awarded to Erret Williams, of Greenville, S. C.

Outside the regularly scheduled events was an exhibition by fliers of the Huff-Daland Dusters, illustrating the method of dusting crops.

Erle Seabock, Canadian stunt flier, who came from Washington, D. C., gave the crowds some decided thrills. Another prominent flier at the meet was Lieutenant Ennis Whitehead, of the Army's Pan American flight.

The judges of the contest were W. T. Mayo, commissioner of public utilities of Shreveport; S. R. Elliott, vice president of the Shreveport chamber of commerce; Leon Booth, governor of the National Aeronautic Association for Louisiana; Jake Meier, president of the local N. A. A. chapter; A. J. Dupuy, president of the Lions' Club, Bossier City, Louisiana; and J. E. Broyles, Shreveport, former army pilot and a director of the N. A. A.

The airport, covering 142 acres, is practically level, entirely cleared and naturally drained, and has a good sod. It is equipped with a modern hangar, 80 by 110 feet, with a 16-foot clearance. There is a licensed mechanic on the field at all times, and fuelling and repair service available. Flood lights and a beacon are being installed.

Free transportation to and from the field in a first class automobile is provided by the Shreveport Airways for all transient passengers and pilots. There is a restaurant on the field serving meals at all hours. E. B. Redline, president of the Shreveport Airways, Inc., is an experienced flier. He is vice president of the Henderson Iron Works and Supply Company. The field manager and chief pilot of the Shreveport Airways is Van Lear Leary. Rudolph Anger is chief mechanic.

OKLAHOMA AIR NEWS

By Ernest W. Fair

THE Southwest Airways of Oklahoma City has been formed with R. H. Tarbutton, Lila Tarbutton and O. A. Cargill, of Oklahoma City, as incorporators.

THROUGH arrangements with the Oklahoma Bus Association, eighty-five towns in Oklahoma are to have air mail service. The Bus Association, through its president, A. J. Harrell, has worked out a plan whereby all busses coming into and leaving the Union bus station in Oklahoma City will pick up and deliver free of charge all air mail to and from the eighty-five towns. From the bus station, it will be transmitted to the air mail port.

EARLE P. HALLIBURTON, Duncan oil man and aviation booster, has given the city of Duncan ten acres of land adjacent to the present airport to be used for improvements. The original field is a 40-acre field.

ALTUS has voted a $150,000 bond issue to establish an airport.

THE Cordell city council has set aside $25,000 for an airport. $15,000 is to be used for the purchase of a new field; $5,000 for improvements and $5,000 is to be set into a reserve fund for operation.

RALPH BERRY and W. B. Estes, both of the Oklahoma Chamber of Commerce, were speakers at the dedication of the municipal airport of Elk City.

THE Ponca City municipal airport site has been approved by C. E. Fleming, assistant manager of the National Air Transport Co., and D. A. Askew, division superintendent.

THE American Legion post No. 55 has been granted authority of supervising the installation of the Vinita airport. It is to be built near the Northeastern Oklahoma hospital, two miles northeast of Vinita.

JACK RUSSELL, formerly of Tonkawa, has opened an aviation school at Shawnee.

C. C. WALTERS, Charles Droege, E. J. Blank, Charles Griffith and Ronald V. Slogel, have been appointed as the committee to take charge of the construction of the Cushing municipal airport.

Air Service Corporation

THE Air Service Corporation, Oklahoma City, has the distributorship for the State of Oklahoma, and Panhandle of Texas, including seventy-eight counties, for Monocoupe and Monocoach airplanes, manufactured by the Mono Aircraft, Inc., of Moline, Ill.

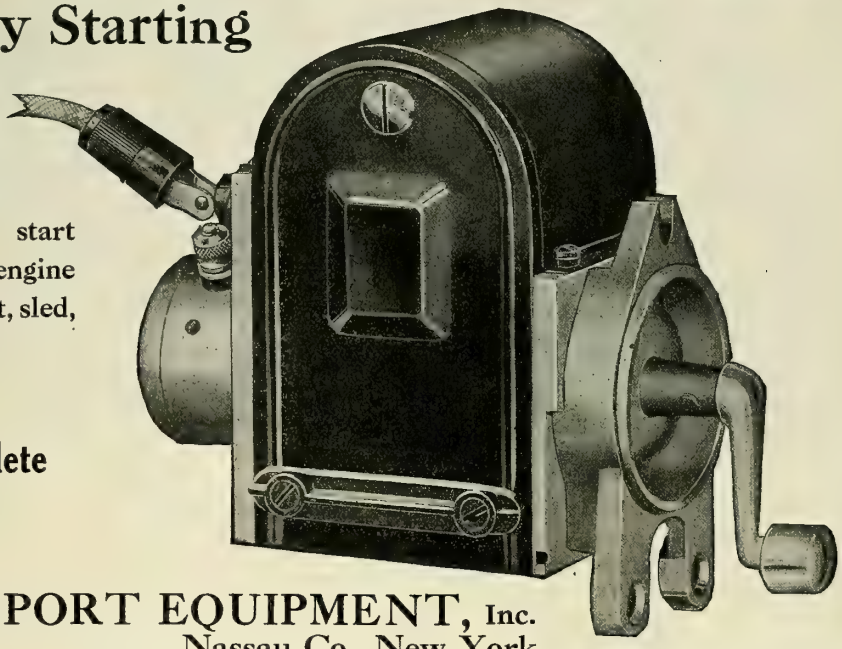
H. W. Parker is general manager of the company. Officers are H. W. Parker, president; Lee B. Bradway, vice-president; J. R. Green, vice-president, and P. H. Mullins, treasurer.

(Continued on next page)

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MR. R. S. FOGG AND HIS WACO-EDO SEAPLANE

MR. R. S. FOGG of *The Weirs*, N. H. has been flying for 10 years and has operated flying boats on Lake Winnipesaukee for five years. He was the first pilot from the States to reach Greenly Island. He has enough commercial experience to choose the right kind of equipment. He has carried over 11,000 passengers without the slightest injury. He realizes that modern, safe and efficient equipment is necessary for the success of commercial flying. This year he replaced his faithful flying boat with a Waco 10 Seaplane equipped with Edo "De Luxe" floats.



Lake Winnipesaukee is surrounded by mountains. On many a bright, sunny day the gusty offshore wind makes it dangerous to operate a war time flying boat. Now, with a powerful Wright engine in a Waco-Edo Seaplane he can operate in any weather. While the Seaplane carries only two passengers against three in a flying boat, Mr. Fogg secures a larger volume of business because of larger number of flying days.

Mr. Fogg finds his Waco-Edo Seaplane very easy to handle on the water. He brings it head on to the inclined platform, where the man is seen standing in the photograph, shuts the engine off and lets the Seaplane slide up the platform until it stops. Then his mechanic pushes it off and turns the ship around by the wing and tail without going into the water. Two passengers disembark, two new ones get in, the pull of the Heywood starter button, and the Seaplane is taxiing again for a take-off. The whole operation takes less than a minute.

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College Point L. I., N. Y.

STANDARDIZED ALL METAL SEAPLANE FLOATS

Say you saw it in AERO DIGEST

(Oklahoma Air News continued)

NEW OKLAHOMA AIRLINES

THE Paul R. Braniff company started service between Tulsa, Okmulgee and Ponca City on August 14. A Ryan Brougham, piloted by Maurice Marrs is used on this run. The Okmulgee and Ponca City ships meet the Tulsa and Oklahoma City ships at Tulsa offering through passenger service by air from either Okmulgee or Ponca City to Oklahoma City. The Tulsa-Oklahoma Airline was opened by this company during June.

At present the passenger airlines of this company fly 1,100 miles daily on schedule runs. By January 1st through service from Kansas City to Fort Worth and Dallas twice daily will be in operation.

Paul R. Braniff is president of Paul R. Braniff, Inc., operators of these airlines; T. E. Braniff, vice president; W. A. Lybrand, secretary; E. E. Westervelt, treasurer; Knight P. Douglas, Tulsa, Okla., general passenger agent; Paul Moore, equipment manager, at Municipal Field, Oklahoma City.

TULSA AIR NEWS

BY SHELTON LAWRENCE

DR. WILLIAM G. FRIEDRICH, former chief research engineer of the aeronautics branch of the Czecho-Slovakian government, has been added to the technical staff of the Spartan Aircraft Company in the capacity of chief research engineer. Dr. Friedrich has charge of development of new designs and models and improvements. He is an expert on the Walter motor, made at Prague, and with which Spartan planes are now being equipped, the company having obtained exclusive rights in North America for manufacturing and distributing.

With Dr. Friedrich in charge of the research department and George Hammond as chief production engineer, Willis C. Brown, designer of the present Spartan biplane and president of the company, feels that he has one of the best aeronautical engineering organizations in the country.

The new Spartan factory at Sheridan road and the Frisco railroad, near Dawson, is nearing completion and ample space has been provided for a constantly expanding engineering department, in which fifteen men are already employed.

THE establishment of an international school of aeronautics at the new Tulsa airport is one of the newest projects being discussed by Tulsa aviation circles.

The school is to have one of the best known faculties ever obtained for a project of this kind, according to the ideas of W. G. Skelly, oil magnate, civic leader and director of the Spartan Aircraft Company at Tulsa. The executive head of the school has already been selected and is working out his curriculum. The course will embrace every branch of aeronautics, including engineering, aerodynamics, ground instruction, motors, navigation, meteorology and piloting, with nationally and internationally kown instructors in each course.

THE Marland Refining Company is planning to mark the roofs of its warehouses with the names of the towns for information of pilots. It will start with a lane approximately 25 miles wide extending from Chicago to Dallas along the N.A.T. route.

TULSA AIRPORT

THE Tulsa Municipal Airport's first building will be a steel, tile and stucco hangar, 80 by 120 feet, with a leanto to house shops, offices, etc. B. Russel Shaw, Inc., of St. Louis, has been awarded the contract for preparing the plans. An administration building of unique design and providing, among other things, a covered loading and unloading platform for airplane passengers, is to be constructed, as well as a pilot's house, two stories, with lounging room and twelve bed rooms, and one other hangar similar to the first one. In addition to these improvements a number of private concerns will proceed immediately with the erection of buildings to conform to the general architectural scheme. One of these will be Southwest Ryan Airlines, Inc., distributors of Ryan monoplanes, and the Spartan Aircraft Co., of Tulsa. The latter concern, with a new factory one quarter of a mile south of the airport, will erect on the airport a beautiful structure to house sales offices, rigging and storage hangar, and quarters for the newly organized Spartan School of Aeronautics.

Tulsa Municipal Airport, underwritten by a group of wealthy citizens, is a 400-acre site six miles northeast of the city. It is an ideal natural site, with perfect drainage and is now being sodded with Bermuda grass. There will be four runways, each 500 feet wide and 2500 feet long. Complete lighting installation is being contracted for.

Paul Braniff, Inc., operating a daily passenger service between Oklahoma City, Tulsa, Ponca City and Okmulgee, will operate from the airport as soon as the first permanent building is available. The N. A. T. is now operating from the airport on its line from Tulsa to Ponca City.

A temporary building is being used. It contains administration offices, N. A. T. office, air mail office, five bedrooms with lockers and shower baths. No natural gas line was available so a "Skelgas" installation was made. This is a "bottled" natural gas that provides hot water for the showers. It works the same as natural or artificial gas and comes in steel cylinders. It was developed by Skelly Oil Company of Tulsa, a concern that has shown a great interest in aeronautics.

Charles E. Short, a veteran of the Army Air Corps, is temporarily in charge of the Municipal Airport, which will be operated and developed by the underwriters until such time as the city sees fit to take it over through the medium of a bond issue. The sum of $300,000 is already available by private subscription for purchase of the site and improvements. When completed it is expected that $500,000 will represent the total investment.

ARKANSAS AIR NEWS

BY CARL OLSSON

NEARLY all plans have been completed for the first air tour of the state of Arkansas, which will be sponsored by the Little Rock Chamber of Commerce, beginning September 24. At least 25 planes will be listed in the party making the tour, which will last four days.

Charles M. Taylor and Lieut. Gordon S. Darnell made a trip over the state to inspect landing fields and to make suggestions to provide additional facilities. The following cities were visited by the pathfinders and probably will be included in the route: Forrest City, Paragould, Jonesboro, Newport, Searcy, Conway, Clarksville, Fort Smith, Hot Springs National Park, Arkadelphia, Hope, Texarkana, El Dorado, Monticello and Pine Bluff.

THE annual encampment of the 154th Observation Squadron, Arkansas National Guard, was held from August 19 to September 1 in connection with the annual training of the 153rd Infantry of the state guard. The squadron encamped at the Little Rock Airport, its home station, and took instruction from Lieut. Leland R. Hewitt and Sergeant Instructor L. Buckland, both of the Air Corps.

Nearly all the personnel, 20 officers and 70 enlisted men, were present. Major J. Carroll Cone, state auditor, was in command. The squadron had three Douglas O-2 observation planes and three PT-1 training planes in service.

A 50-ACRE addition to the Monticello airport has been made, making the field nearly one-half mile square. The additional space was bought by the Monticello Chamber of Commerce, which plans to place it in first class condition by removing obstructions, leveling and joining it to the original field.

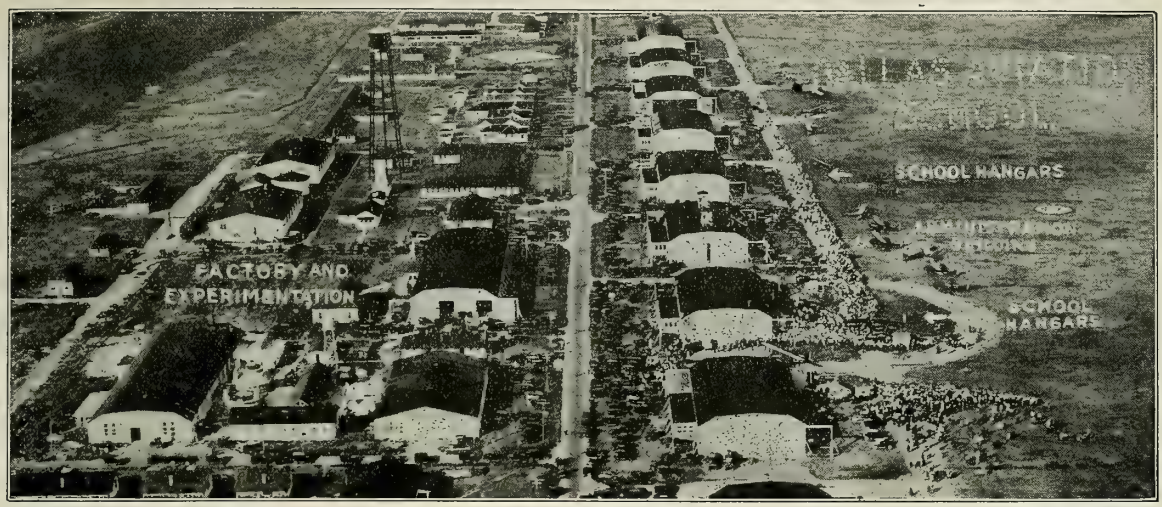
RUSSELL LAMBERT of Pine Bluff has recently purchased a Laird plane. He now owns two planes and plans to build a private landing field on his plantation near Pine Bluff.

THE Arkansas Aircraft Corporation has contracted with the Missouri Broadcasting Corporation of St. Louis, Missouri, whereby the Command-Aire will be advertised daily over Station WIL both afternoon and evening for a period of six months. This is believed to be the first time an airplane manufacturing company has gone on the air on a regular commercial advertising contract and for a continued period of time.

TENNESSEE AIR NEWS

ST. JOHN FIELD, Jackson, Tennessee, named in honor of Lieut. A. M. St. John, wartime flier who was killed at Kelly Field, Texas, shortly after the Armistice, was formally dedicated recently. The field is the home of the Jackson Aero Club. It is located three miles from Jackson on the Memphis-Bristol Highway.

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Practical Science of Aviation in ten lessons. This course is free if followed by flying course in either of our schools.

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Shock Absorber Suspension Standard Equipment on the CESSNA CANTILEVER MONOPLANE

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The Cessna Cantilever monoplane is reputed to be the fastest 4-passenger, commercial Whirlwind engined plane ever flown. Incorporated in Mr. Cessna's ingenious landing gear, which has unusually low parasite resistance, are Rusco Aero Rings. The set of 16 rings weighs only 3 lbs. and they are practically all enclosed in the fuselage.

These light weight, efficient shock absorbers are doing their bit in contributing to the success of this remarkable plane.

Other planes using Rusco Aero Ring equipment on either landing gear or tail skid are Curtiss Robin, Stinson, Bellanca, American Eagle, Fokker, Pitcairn, and Driggs.

Write to New York office for circular of other Rusco Aero Products. Give full particulars of your landing gear problems so that our engineering department can co-operate with you.

THE RUSSELL MANUFACTURING CO.

SALES & ENGINEERING OFFICE
349 BROADWAY, NEW YORK CITY

FACTORY
MIDDLETOWN, CONN.

OFFICIAL WORLD AIR RECORDS

CONFIRMED BY THE FEDERATION AERONAUTIQUE INTERNATIONALE, AUGUST 15, 1928

CLASS A—BALLOONS

Grand "Free For All" Record

Duration (Germany).....87 hrs.
H. Kaulen, Dec. 13-17, 1913.
Distance (Germany).....3052.7 kil. (1,896.9 mi.)
Berliner, Feb. 8-10, 1914.
Altitude (Germany).....10,800 m. (35,424 ft.)
Suring and Berson, July 31, 1901.

First Category (600 *Cubic Meters*)

Duration (France).....22 hrs. 34 min.
G. Cormier, Aug. 10-11, 1924.
Distance (France).....804.173 kil. (499.69 mi.)
Georges Cormier, July 1, 1922.
Altitude (No Record)

Second Category (601-900 *Cubic Meters*)

Duration (France).....23 hrs. 28 min.
Jules Dubois, May 14-15, 1922.
Distance (France).....804.173 kil. (499.69 mi.)
Georges Cormier, July 1, 1922.
Altitude (No Record)

Third Category (901-1200 *Cubic Meters*)

Duration (United States).....26 hrs. 46 min.
E. J. Hill and A. G. Schlosser, Ford Airport to Montvale, Va., July 4-5, 1927.
Distance (United States).....920.5 kil. (572 mi.)
S. A. U. Rasmussen, Ford Airport to Hookerton, N. C., July 4-5, 1927.
Altitude (No Record)

Fourth Category (1201-1600 *Cubic Meters*)

Duration (United States).....26 hrs. 46 min.
E. J. Hill and A. G. Schlosser, Ford Airport to Montvale, Va., July 4-5, 1927.
Distance (United States).....920.5 kil. (572 mi.)
S. A. U. Rasmussen, Ford Airport to Hookerton, N. C., July 4-5, 1927.
Altitude (No Record)

Fifth Category (1601-2200 *Cubic Meters*)

Duration (France).....49 hrs.
Georges Blanchet and Dr. Geo. LeGallee, Gordon-Bennett, Detroit-Waverly Hall, Ga., Sept. 10-11-12, 1927.
Distance (United States).....1198.9 kil. (745 mi.)
E. J. Hill and A. G. Schlosser, Gordon-Bennett, Detroit-Baxley, Ga., Sept. 10-11-12, 1927.
Altitude (No Record)

Sixth Category (2201-3000 *Cubic Meters*)

Duration (France).....49 hrs.
Georges Blanchet and Dr. Geo. LeGallee, Detroit-Waverly Hall, Ga., Sept. 10-11-12, 1927.
Distance (United States).....1198.9 kil. (745 mi.)
E. J. Hill and A. G. Schlosser, Gordon-Bennett, Detroit-Baxley, Ga., Sept. 10-11-12, 1927.
Altitude (United States).....8,690 m. (28,510 ft.)
Capt. Hawthorne C. Gray, at Scott Field, Belleville, Ill., Mar. 9, 1927.

Seventh Category (3001-4000 *Cubic Meters*)

Duration (France).....49 hrs.
Georges Blanchet and Dr. Geo. LeGallee, Gordon-Bennett, Detroit-Waverly Hall, Ga., Sept. 10-11-12, 1927.
Distance (United States).....1198.9 kil. (745 mi.)
E. J. Hill and A. G. Schlosser, Gordon-Bennett, Detroit-Baxley, Ga., Sept. 10-11-12, 1927.
Altitude (United States).....8,690 m. (28,510 ft.)
Capt. Hawthorne C. Gray, at Scott Field, Belleville, Ill., Mar. 9, 1927.

Eighth Category (4001-5000 *Cubic Meters*)

Duration (France).....49 hrs.
Georges Blanchet and Dr. Geo. LeGallee, Gordon-Bennett, Detroit-Waverly Hall., Ga., Sept. 10-11-12, 1927.
Distance (United States).....1198.9 kil. (745 mi.)
E. J. Hill and A. G. Schlosser, Gordon-Bennett, Detroit-Baxley, Ga., Sept. 10-11-12, 1927.
Altitude (United States).....8,690 m. (28,510 ft.)
Capt. Hawthorne C. Gray, at Scott Field, Belleville, Ill., Mar. 9, 1927.

CLASS B—AIRSHIPS

Returning to Point of Departure

Duration (Italy).....15 hrs.
Castracane and Castruccio, P-5, June 25, 1913.
Distance (Italy).....810 kil. (503.3 mi)
Castracane and Castruccio, P.5, July 30, 1913.
Altitude (France).....3,080 m. (10,102 ft.)
Cohen, Conte, June 18, 1912.

CLASS C—AIRPLANES

Returning to Point of Departure without Refueling

Duration (Germany).....65 hrs. 25 min.
Johann Risztics and Wilhelm Zimmerman, Junkers W-33, Junkers LV 280 h.p. at Dessau, July 5-6-7, 1928.
Distance (Closed Circuit) (Italy).....7666.6 kil. (4763.7 mi.)
Arturo Ferrarin and Carl DelPrete, Savoia-Marchetti, S-64, Fiat A-22, Course Casale dei-Prati, Torre Flaria, Fara, d'Anzio, May 31-June 1-2, 1928.
Distance (Airline) (United States).....6,294 kil. 3,911 mi.)
Clarence D. Chamberlin, Bellanca, Wright J-5, 200 h.p., Roosevelt Field to Isleben, Germany, June 4-5-6, 1927.
Altitude (United States).....11,710 m. (38,418 ft.)
Lt. C. C. Champion, U. S. N., Wright Apache, Pratt & Whitney "Wasp" Supercharged 425 h.p., at Anacostia, D. C., July 25, 1927.
Maximum Speed (France).....448.171 k.p.h. (278.480 m.p.h)
Warrant Officer Bonnett, Ferbois monoplane, Hispano Suiza, 550 h.p., at Istres, France, Dec. 11, 1924.

SPEED FOR SPECIFIED DISTANCES WITHOUT PAY LOAD

Speed for 100 kil. (United States).....401.279 k.p.h. (249.342 m.p.h)
Lt. Cyrus Bettis, U.S.A.S., Curtiss R3C-1, Curtiss V-1400 600 h.p., Mitchel Field, N. Y., Oct. 12, 1925.
Speed for 500 kil. (France).....306.696 k.p.h. (190.567 m.p.h.)
Sadi-Lecointe, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Istres, June 23, 1924.
Speed for 1,000 kil. (France).....248.296 k.p.h. (154.293 m.p.h.)
Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Etampes, Aug. 29, 1925.
Speed for 2,000 kil. (France).....218.759 k.p.h. (135.930 m.p.h.)
Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 h.p., Villesauvage, Sept. 12, 1925.
Speed for 5,000 kil. (Italy).....139.177 k.p.h. (86.479 m.p.h.)
Arturo Ferrarin and Carl DelPrete, Savoia-Marchetti, S-64, Fiat A-22, Course Casale dei Prati, Torre Flaria, Fara, d'Anzio, May 31-June 1-2, 1928.

CLASS C—WITH USEFUL* LOAD OF 500 KILOGRAMS (1,102.31 lbs.)

* Pay load or ballast exclusive of pilot, gasoline and oil.

Returning to Point of Departure

Duration (Germany).....22 hrs. 11 min. 45 sec.
W. K. Schnabele and Fritz Loose, Junkers W-33, Junkers L-5 engine, 320 h.p., at Dessau, March 21-22, 1927.
Distance (Germany).....2,735.586 kil. (1,699.81 mi.)
W. K. Schnabele and Fritz Loose, Junkers W-33, Junkers L-5 engine, 320 h.p., at Dessau, March 21-22, 1927.
Altitude (United States).....8,578 m. (28,143 ft.)
Lt. H. R. Harris, U.S.A.S., U.S.A. TP-1, Liberty, 400 h.p., at McCook Field, Dayton, O., May 21, 1924.
Speed for 100 kil. (France).....281.030 k.p.h. (174.622 m.p.h.)
Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 h.p., at Etampes, Oct. 7, 1925.
Speed for 500 kil. (Gt. Britain).....255.333 k.p.h. (158.656 m.p.h.)
Capt. H. S. Broad, Havilland "Hound." Napier-Lion XI, 550 h.p., at Stag Lane Reading, April 27, 1928.
Speed for 1,000 kil. (France).....236.028 k.p.h. (146.660 m.p.h.)
Fernand Lasne, Nieuport-Delage, Type 42, Hispano-Suiza, 500 h.p., at Etampes, May 14, 1926.
Speed for 2,000 kil. (Germany).....205.407 k.p.h. (127.632 m.p.h.)
H. Steindorff, Rohrbach-Roland 3 BMW, 230 h.p., ea., at Staaken, July 31, 1927.
Speed for 5,000 kil. (No Record)

CLASS C—WITH USEFUL LOAD OF 1,000 KILOGRAMS (2,204.12 lbs.)

Returning to Point of Departure

Duration (Germany).....14 hrs. 23 min. 45 sec.
Fritz Horn, Junkers G-24, 3 Junkers L-11, 230 h.p. ea., at Dessau, April 4, 1927.
Distance Germany.....2,315.338 kil. (1,438.680 mi.)
H. Steindorff, Rohrbach-Roland 3 BMW, 230 h.p. ea., at Staaken, July 31, 1927.
Altitude (Germany).....6,805 m. (22,326 ft.)
Hermann Steindorff, Rohrbach-Roland, 3 BMW, 230 h.p. ea., at Staaken, Aug. 12, 1927.
Speed for 100 kil. (Gt. Britain).....261.172 k.p.h. (160.280 m.p.h.)
Capt. H. S. Broad, Havilland "Hound", Napier-Lion XI, 550 h.p., at Stag Lane Reading, April 27, 1928.
Speed for 500 kil. (Gt. Britain).....255.333 k.p.h. (158.656 m.p.h.)
Capt. H. S. Broad, Havilland "Hound", Napier-Lion XI, 550 h.p., at Stag Lane Reading, April 27, 1928.
Speed for 1,000 kil. (France).....218.274 k.p.h. (135.628 m.p.h.)
Paillard, Bernard monoplane, Jupiter-Gnome-Rhone, 420 h.p., at LeMerle-Arles-Port Louis, Jan. 24, 1928.
Speed for 2,000 kil. (Germany).....205.407 k.p.h. (127.632 m.p.h.)
Hermann Steindorff, Rohrbach-Roland, 3 BMW, 230 h.p. ea., at Staaken, July 31, 1927.
Speed for 5,000 kil. (No Record)

CLASS C—WITH USEFUL LOAD OF 2,000 KILOGRAMS (4,409.24 lbs.)

Returning to Point of Departure

Duration (Germany).....13 hrs. 1 min. 12 sec.
J. Risticz, Junkers G-24, 3 Junkers 280 h.p., at Dessau, June 29, 1927.
Distance (Germany).....1,750.469 kil. (1,087.68 mi.)
Hermann Steindorff, Rohrbach-Roland, 3 BMW, 230 h.p., at Staaken, July 31, 1927.
Altitude (Italy).....6,262 m. (20,544 ft.)
Domenico Antonini, Caproni CA-73, 2 Isotta Fraschini, 500 h.p. ea., at Cascina Malpensa, May 26, 1927.
Speed for 100 kil. (Germany).....216.107 k.p.h. (134.28 m.p.h.)
Hermann Steindorff, Rohrbach-Roland, 3 BMW, 230 h.p. ea., at Staaken, July 29, 1927.
Speed for 500 kil. (Germany).....215.378 k.p.h. (133.828 m.p.h.)
Hermann Steindorff, Rohrbach-Roland, 3 BMW, 230 h.p. ea., at Staaken, July 28, 1927.
Speed for 1,000 kil. (Germany).....214.855 k.p.h. (133.504 m.p.h.)
Hermann Steindorff, Rohrbach-Roland, 3 BMW, 230 h.p. ea., at Staaken, July 28, 1927.

CLASS C—WITH USEFUL LOAD OF 5,000 KILOGRAMS (11,023 lbs.)

Duration (France).....1 hr. 12 min. 21 sec.
L. Bossoutrot, Super Farman-Goliath, 4 Farman, 500 h.p. ea., at LeBourget, Nov. 16, 1925.
Altitude (France).....3,586 m. (11,765 ft.)
L. Bossoutrot, Super Farman-Goliath, 4 Farman, 500 h.p. ea., at LeBourget, Nov. 16, 1925.
Speed for 100 kil. (No Record)
Speed for 500 kil. (No Record)

CLASS C—GREATEST PAY LOAD CARRIED TO AN ALTITUDE OF 2,000 METERS (6,671.7 ft.)

(France).....6,000 kgs. (13,228 lbs.)
L. Bossoutrot, Super Farman-Goliath, 4 Farman, 500 h.p. ea., at Le Bourget, Nov. 16, 1925.

CLASS C—REFUELING IN FLIGHT

Returning to Point of Departure

Duration (Belgium).....60 hrs. 7 min.
Adj. Louis Crooy and Sgt. Victor Groenen, DH 9, Siddeley-Puma at Tirlement, June 2-3-4, 1928.

RECORDS FOR LIGHT AIRPLANES

CLASS C—1st CATEGORY

Two seaters weight empty less than 400 *Kgs.*

Distance (Closed Circuit) (Czechoslovakia) 1,500 kil. (932 mi.)
Joseph Hermansky and Francois Machacek, Avia BH-9, Walter 60 h.p. at Prague, July 11, 1928.
Distance (Airline) (Czechoslovakia).....1,058.2 kil. (657.4 mi.)
Madam Maryse Bastie and Maurice Drouhin, Caudron 109, Salmson 40 h.p., LeBourget-Treptow, July 13, 1928.
Altitude (Germany).....5,680 m. (18,635 ft.)
Joseph Bohne and Reinhold Lofink, Baumer B.LV-D1158, Wright L4, 60 h.p., at Hamburg, Oct. 9, 1927.
Speed for 100 kil. (Germany).....191.959 k.p.h. (119.276 m.p.h.)
Paul W. Baumer and P. Puls, Baumer, Wright 60 h.p., Hamburg-Fuhlsbuttel, July 10, 1927.

LIGHT AIRPLANES

CLASS C— SECOND CATEGORY

Single seaters weight empty less than 200 *Kgs.*

Distance (Closed Circuit) (Hungary).....650 kil. (403.9 mi.)
Chas. Kaszala, Lampich Monoplane, Thorutzkai engine, 18 h.p., at Budapest, Sept. 14, 1927.
Distance (Airline) (Hungary).....517.04 kil. (832.03 mi.)
Chas. Kaszala, Lampich H-MAFD, Thorutskai 18 h.p. Budapest-Pola, June 14, 1928.
Altitude (No Record)
Speed for 100 kil. (No Record)

LIGHT AIRPLANES

CLASS C—THIRD CATEGORY

Single seaters weight empty 200-350 *Kgs. inc.*

Distance (Closed Circuit) (Czechoslovakia) 2,500 kil. (1,553 mi.)
Commandant Vicherck, Avia BH-11B, Walter 60 h.p., at Prague, June 6-7, 1928.
Distance (Airline) (United States).....1564 kil. (972 mi.)
Harry J. Brooks, Ford monoplane, Ford type AC motor, 36 h.p., Detroit-Titusville, Fla., Feb. 21, 1928.
Altitude (Germany).....6,782 m. (22,250 ft.)
Paul W. Baumer, Baumer, Wright 60 h.p., Hamburg-Fuhlsbuttel, July 8, 1927.
Speed for 100 kil. (Gt. Britain).....300.1 k.p.h. 186.47 m.p.h.)
Capt. H. S. Broad, DH "Tiger Moth," DH 32 engine, 130 h.p., at Stag Lane, Aug. 24, 1927.

CLASS C2—SEAPLANES

Returning to Point of Departure without Refueling

Duration (United States).....36 hrs. 1 min.
Lieuts. Arthur Gavin and Zeus Soucek, Navy PN-12, 2 Wright R-1570 525 h.p. ea., at Phila., May 3-4-5, 1928.
Distance (United States).....2,525 kil. (1,569 mi.)
Lts. B. J. Connell and H. C. Rodd, PN-10, 2 Packard 600 h.p. ea., at San Diego, Cal., Aug. 15-16, 1927.
Distance (Airline) (United States).....2,963 kil. (1,841 statute mi.)
Comdr. John Rodgers, U.S.N., and Lt. B. J. Connell, PN-9, 2 Packard 1-A-1500, 500 h.p. ea., San Pablo Bay, Cal., to near Hawaii, Aug. 31-Sept. 1, 1925.
Altitude (United States).....11,581 m. (37,995 ft.)
Lt. C. C. Champion, U.S.N., Wright "Apache," Pratt & Whitney "Wasp" supercharged, 425 h.p., at Anacostia, D. C., July 4, 1927.
Maximum Speed (Italy).....312.776 k.p.h. (318.624 m.p.h.)
Maj. Mario de Bernardi, Macchi. M-52, Fiat A53 engine, at Venice, Italy, Mar. 30, 1928.

SPEED FOR SPECIFIED DISTANCES

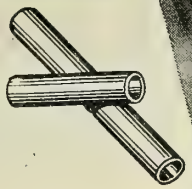
Speed for 100 kil. (Gt. Britain).....456.522 k.p.h. (283.669 m.p.h.)
Lt. Webster, Supermarine S-5 Napier, 1,000 h.p., at Venice, Sept. 26, 1927.
Speed for 500 kil. (United States).....259.328 k.p.h. (161.14 m.p.h.)

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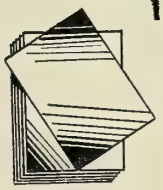
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Tubing



Strip Steel



All materials for repair or construction

SHEET ALUMINUM

Half hard in either coiled or flat sheets. Flat sheets come in a wide range of sizes and thicknesses. All sheets are carefully inspected and guaranteed free from defect. Exceptionally good for aircraft use, readily fitted, light and strong. Charge for materials ranging from 45c. per lb. for No. 8 B & S gauge to $1.10 per lb. for No. 34 B & S gauge. Coiled sheets also offer wide variety of sizes and thicknesses. Cost from 48c. per lb. for No. 14 B & S gauge to 65c. per lb. for No. 34 B & S gauge.
Duralumin sheeting, either flat or coiled, also is popular in aircraft work. Shipment will require about five weeks.

TUBING

Aluminum—Chrome Molybdenum—20-30 carbon--AN Steel. Every needed size and strength of tubing for all aircraft construction purposes in our complete stock. Streamline tubing is obtainable in welded seams, Army Specification 20-30 carbon, or Army Specification chrome molybdenum. Round tubing available in aluminum, low carbon, chrome molybdenum and AN steel. All tubing is tested for gauge and strength; especially designed and manufactured for aircraft use. Immediate shipment on all popular sizes. Complete stock of duralumin tubing also on hand for building and repair. Extremely low prices. Write for prices, giving specifications.

STRIP STEEL

Sheet steel, mild carbon—cold rolled. This is air corps specification in every respect. The stock size of sheets is 12 x 72, weight of each sheet 24 B. WG. is 5.37 lbs.; 14 B. WG. is 20.28 lbs. Priced from $1.15 per sheet for 24 gauge upwards to $11.10 for lesser gauge.

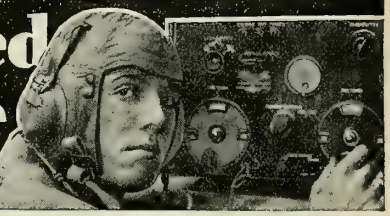
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City ..... State.....
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OFFICIAL WORLD RECORDS

(Continued from preceding page)

Lt. R. A. Ofstie, U. S. N., Curtiss Navy C-R, seaplane, Curtiss D-12, 450 h.p., at Bay Shore, Baltimore, Md., Oct. 25, 1924.
Lt. R. A. Ofstie, U. S. N., Curtiss Navy C-R, seaplane, Curtiss D-12, 450 h.p., at Bay Shore, Baltimore, Md., Oct. 25, 1924.

Speed for 1,000 kil. (United States)....210.716 k.p.h. (130.932 m.p.h.)
Lt. R. Irvine, Vought "Corsair," Pratt & Whitney "Wasp," 425 h.p., at Hampton Roads, Va., May 21, 1927.
Speed for 2,000 kil. (Switzerland).....172.00 k.p.h. (106.875 m.p.h.)
Richard Wagner and Georges Zinsmaier, Dornier "Merkur," BMW 500-600 h.p., at Altenrheim, Aug. 10, 1927.
Speed for 5,000 kil. (No Record)

CLASS C2—WITH USEFUL* LOAD OF 500 KILOGRAMS (1,102.31 lbs.)

* Pay load or ballast exclusive of pilot, gasoline and oil.

Returning to Point of Departure

Duration (United States).....20 hrs. 45 min. 40 sec.
Lts. B. J. Connell and H. C. Rodd, PN-10, 2 Packard 600 h.p. ea., at San Diego, Cal., Aug. 15-16, 1927.
Distance (United States).....2,525 kil. (1,569 mi.)
Lts. B. J. Connell and H. C. Rodd, PN-10, 2 Packard 600 h.p. ea., at San Diego, Cal., Aug. 15-16, 1927.
Altitude (United States).....6,760 m. (22,178 ft.)
Lt. Geo. R. Henderson, U. S. N., Vought "Corsair", Pratt & Whitney, "Wasp" 425 h.p., at Washington, D. C., April 14, 1927.
Speed for 100 kil. (United States)....236.998 k. p. h. (147.283 m.p.h.)
Lt. S. W. Callaway, U.S.N., Vought "Corsair", Pratt & Whitney, 425 h.p. "Wasp", at Hampton Roads, Va., April 23, 1927.
Speed for 500 kil. (United States).....218.90 k.p.h. (136.023 m.p.h.)
Lt. J. D. Barner, U.S.N., Vought "Corsair", Pratt & Whitney "Wasp", 425 h.p., at Hampton Roads, Apr. 30, 1927.
Speed for 1,000 kil. (Germany).....181.447 k.p.h. (112.695 m.p.h.)
Geo. Juterbock, Junkers W-34, Bristol Jupiter, 420 h.p., at Dessau, May 11, 1927.
Speed for 2,000 kil. (Switzerland).....172.00 k.p.h. (106.875 m.p.h.)
Richard Wagner and George Zinsmaier, Dornier "Merkur", B.M.W., 500-600 h.p., at Altenrheim, Aug. 10, 1927.
Speed for 5,000 kil. (No Record)

CLASS C2—WITH USEFUL LOAD OF 1,000 KILOGRAMS (2,204.62 lbs.)

Returning to Point of Departure

Duration (United States)...17 hrs. 55 min. 13.6 sec.
Lieuts. Zeus Soucek and Lisle J. Maxson, Navy PN-12, 2 Wright R-1750 525 h.p. ea. at Phila., May 25-26, 1928.
Distance (United States).....2,150 kil. (1,336 mi.)
Lt. A. W. Gorton and Chief Boatswn. E. E. Reber, U.S.N., PN-12, 2 Pratt & Whitney 525 h.p. ea., at Phila., July 11-12, 1928.
Altitude (United States).....5,972 m. (19,593 ft.)
Lt. Arthur Gavin, U.S.N., PN-12, 2 Pratt & Whitney R-1690, 525 h.p. ea., at Phila., June 27-28, 1928.
Speed for 100 kil. (Germany).....209.546 k.p.h. (130.105 m.p.h.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Jan. 20, 1928.
Speed for 500 kil. (Italy).....190.637 k.p.h. (118.455 m.p.h.)
A. Passaleva, Savoia-Marchetti, S-62, seaplane, 500 h.p., Isotta Fraschini, at Sesto Calende (LacMajeur), Dec. 30, 1926.
Speed for 1,000 kil. (Switzerland).....177.279 k.p.h. (110.155 m.p.h.)
Richard Wagner, Dornier Superwal DR 142, 4 Jupiter, Gnome-Rhone 480 h.p. ea., at Friedrickshafen, Feb. 2, 1928.
Speed for 2,000 kil. (United States)....130.427 k.p.h. (81.043 m.p.h.)
Lt. A. W. Gorton and Chief Boatswn. E. E. Reber, U.S.N., PN-12, 2 Pratt & Whitney 525 h.p. ea., at Phila., July 11-12, 1928.
Speed for 5,000 kil. (No Record)

CLASS C2—WITH USEFUL LOAD OF 2,000 KILOGRAMS (4,409.24 lbs.)

Returning to Point of Departure

Duration (United States).....16 hrs. 39 min.
Lt. A. W. Gorton and Chief Boatswn. E. E. Reber, U.S.N., PN-12, 2 Pratt & Whitney, 525 h.p. ea., at Phila., July 11,12, 1928.
Distance (United States).....2,150 kil. (1,336 mi.)
Lt. A. W. Gorton and Chief Boatswn. E. E. Reber, U.S.N., PN-12, 2 Pratt & Whitney, 525 h.p. ea., at Phila., July 11-12, 1928.
Altitude (France).....4,684 m. (15368 ft.)
Lt. de Vaisseau, Paris, C.A.M.S., 2 Jupiter-Gnome, 480 h.p. ea., at St. Raphael, Aug. 18, 1927.
Speed for 100 kil. (Germany).....209.546 k.p.h. (130.105 m.p.h.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Jan. 20, 1928.
Speed for 500 kil. (Germany).....179.416 k.p.h. (111.483 m.p.h.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Feb. 2, 1928.
Speed for 1,000 kil. (Germany).....177.279 k.p.h. (110.155 m.p.h.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Feb. 2, 1928.
Speed for 2,000 kil. (United States)....130.427 k.p.h. (81.043 m.p.h.)
Lt. A. W. Gorton and Chief Boatswn. E. E. Reber, U.S.N., PN-12, 2 Pratt & Whitney, 525 h.p. ea., at Phila., July 11-12, 1928.
Speed for 5,000 kil. (No Record)

CLASS C2—WITH PAY LOAD OF 4,000 KILOGRAMS (8,818 lbs.)

Returning to Point of Departure

Duration (Germany).....6 hrs. 1 min. 56 sec.
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Jan. 23, 1928.
Distance (Germany).....1,000.160 kil. (621.468 m.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Feb. 5, 1928.
Altitude (Germany).....2,845 m. (9,334 ft.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Jan. 23, 1928.
Speed for 100 kilo. (Germany).....209.564 k.p.h. (130.105 m.p.h.)
Richard Wagner, Dornier Superwal DR 142, 4 Jupiter-Gnome-Rhone 480 h.p. ea., Friedrichshafen, Jan. 20, 1928.
Speed for 500 kil. (Germany).....179.416 k.p.h. (111.483 m.p.h.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Feb. 2, 1928.
Speed for 1,000 kil. (Germany).....177.279 k.p.h. (110.155 m.p.h.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome-Rhone, 480 h.p. ea., at Friedrichshafen, Feb. 2, 1928.

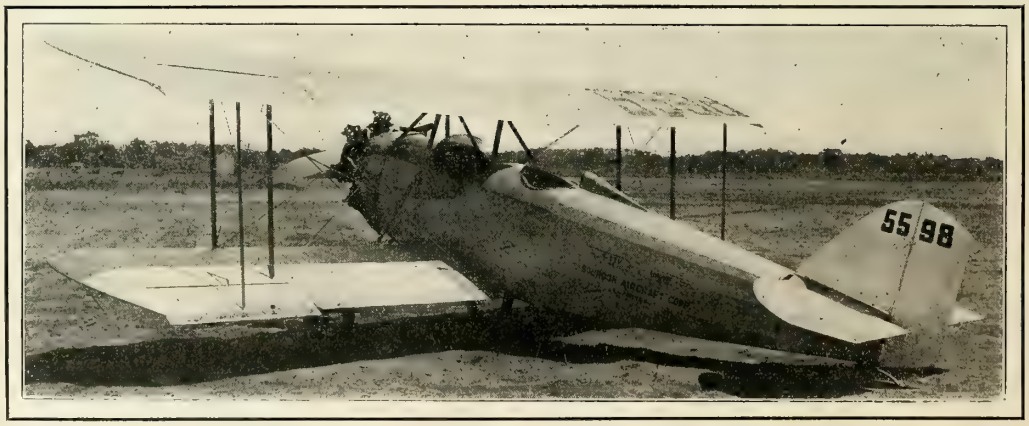
CLASS C2 (Seaplanes)—GREATEST PAY LOAD CARRIED TO AN ALTITUDE OF 2,000 METERS (6,651.7 Ft.)

(Germany).....4,037 kgs. (8,900 lbs.)
Richard Wagner, Dornier-Superwal, D.R. 142, 4 Jupiter-Gnome V1, 480 h.p. ea., at Friedrichshafen, Jan. 23, 1928.

CLASS G—HELICOPTERS

Distance (Airline) (France).....736 m. (2,414 ft.)
Pescara, Pescara Helicopter, 2 screws, Hispano-Suiza, 180 h.p., at Issy-les-Moulineaux, April 18, 1924.

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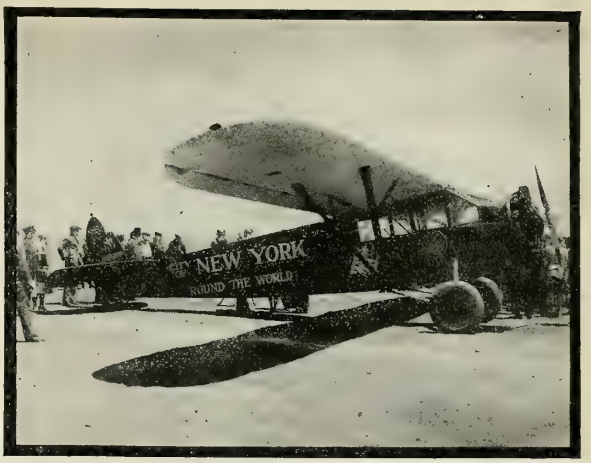
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The Famous Fairchild Cabin Monoplane with which the new globe circling record was established. It is Pyrene-equipped.

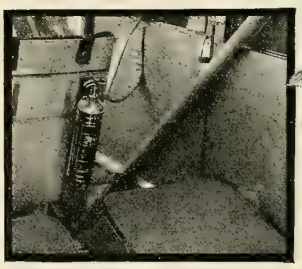
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A Pyrene Fire Extinguisher as installed in the cabin of a Fairchild Plane.

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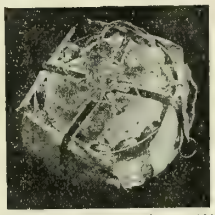


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GEORGIA AIR NEWS

By Al Major

THE finance committee of the city council at a special meeting approved the inclusion of a $5,000 appropriation for the purpose of erecting a building at Candler Field, Atlanta's airport, to house the weather bureau, radio station and postoffice. Other airports on the Atlanta-New York route which have already made provision for similar buildings are Spartanburg, S. C., Greensboro, N. C., Richmond, Va., and Hadley Field, N. J.

THE first Atlanta-built airplane was recently flown in the presence of Mayor I. N. Ragsdale and a group of notables connected with aviation. A "certificate of recognition" especially prepared at the instance of the mayor was presented to the designer and builder, Richard Hillman Harris.

The ship is a two-place, parasol type wing monoplane powered with an OX5 motor. The most radical feature of design is the triangular-shaped fuselage, which is flat on top and comes to a sharp edge at the bottom. This cuts the wind resistance of the nose in half and reduces the weight considerably. The radiator is installed in the nose of the ship. It was successfully flown by Doug Davis and pronounced airworthy. The ship is called the "Harris Wingster."

PITCAIRN AVIATION, INC., officials announce that the Mailwings now being used on the Atlanta-New York route will shortly be replaced by Super-Mailwings, larger and more powerful ships.

BRUNSWICK recently held an air derby as the opening of their new field known as Redfern Field, named in memory of Paul R. Redfern.

AUGUSTA was the meeting place of the South Atlantic Airport Association. This organization was formed to promote an air mail line between the several cities and for mutual benefit. The cities in the association are Charlotte, N. C., Columbia, S. C., Augusta, Ga., and Savannah, Ga.

EASTMAN has recently completed arrangements for an airport. It will be used as an emergency field on the Atlanta-Miami route.

LAWRENCEVILLE now has the name of its town painted on top of the High School. This was done by the Lawrenceville Kiwanis Club.

ATLANTA recently had its first big air meet under the auspices of Swanee Taylor Enterprises, Inc. From a standpoint of attendance it was quite a success as reliable estimates figured at least 30,000 attended the two days of the meet. Among the pilots participating were: Doug Davis, in his special Whirlwind Travel Air biplane; Beeler Blevins, in his Challenger; Stevens, flying a Waco-10; John Kytle, Ben Faulkner, and Gene Brown, in Pitcairn Mailwings; Wells, in an American Eagle; all of Atlanta; also Errett Williams, in his Eaglerock, of Greenville, S. C.; John Gill, in his Waco-10, from Birmingham, Ala.; Bill Alexander, in a Waco-9, from Brunswick, Ga.

Parachute exhibitions were given by Bonnie Rowe, Jack McElvey, and Jesse Exum. An exhibition flight was made by Miss Gladys Poole, Atlanta's first aviatrix.

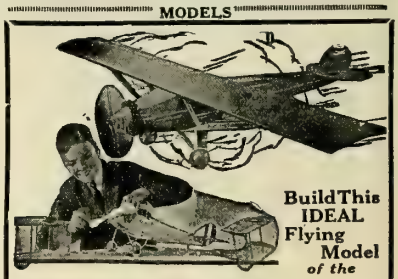
Several air-minded Georgia towns are planning on putting on air Derbys in the next few months. Among them being: Albany, Waycross, Athens, Augusta and Savannah.

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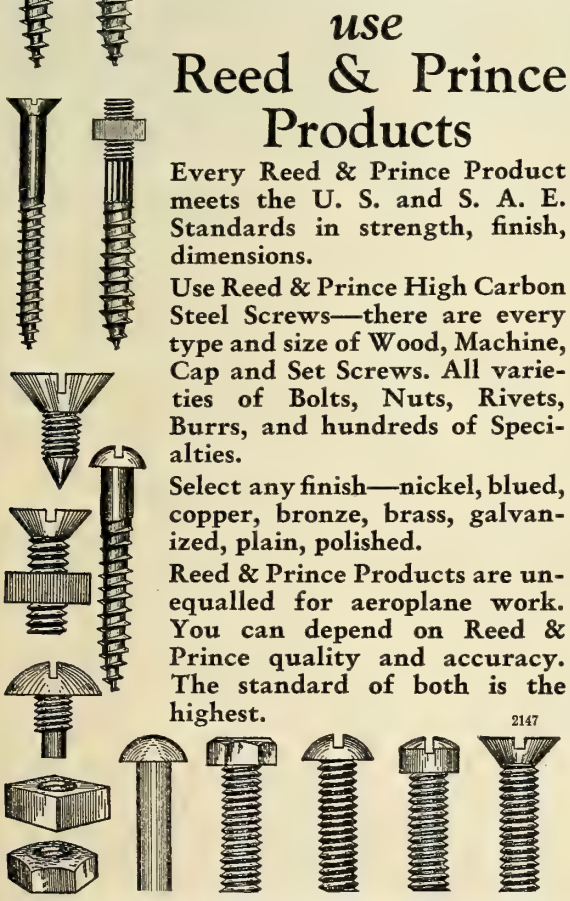
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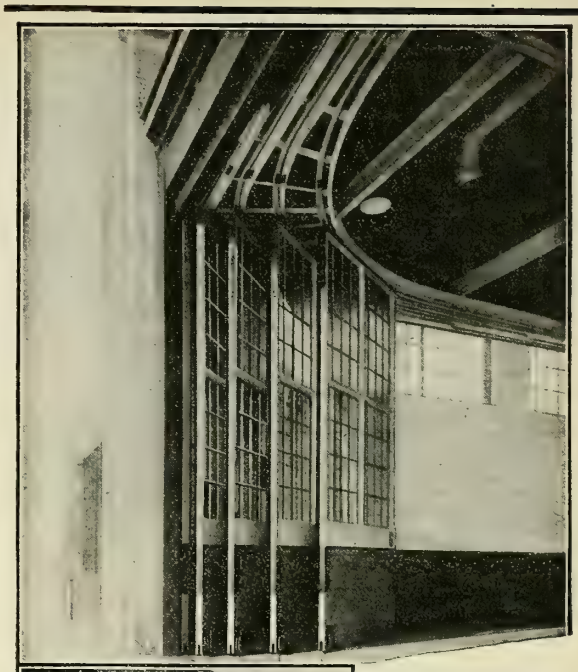
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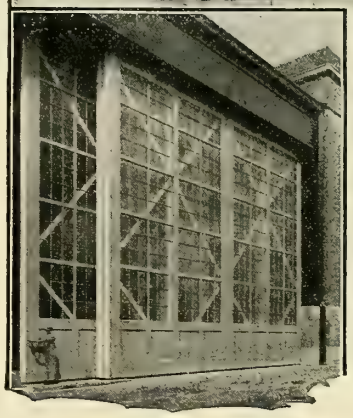
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Close-up view of Truscon Steel Doors, Curved Track Type, in Ford Airplane Hangar, Lansing, Illinois. Albert Kahn, Inc., Architects, Ralph Sollitt & Sons, Contractors.

U. S. Dept. of Aviation Assembly Bldg., Dayton, Ohio. Note size of Doors: Each leaf 20′ wide by 35′ high. Weight of single leaf is 7 tons.

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AIRPLANE HANGAR DOORS

NEWS from the DAKOTAS

By A. E. Riggle

FEDERAL licenses of pilots operating for airline companies in North Dakota must be filed with the state railroad and warehouse commission, and operators of commercial lines will be required to obtain a certificate of public convenience and necessity from the board, Fay Harding, president of the state railroad board, has announced.

When applications are filed the board intends to conduct hearings to obtain as much information as possible which will enable them to propose new legislation governing air transportation to the legislature.

The requirement that each airplane company obtain a certificate of convenience and necessity from the state board is for the purpose of protecting the companies. So long as one airline is giving satisfactory service over a prescribed route another concern will not be permitted to operate planes on the same itinerary.

SEVERAL thousand persons gathered at the little prairie town of Hatton, N. D., on July 21 and 22 and extended a hearty greeting to Lieutenant Ben Eielson, Hatton's famous native son, and his friend and companion, Capt. George H. Wilkins, the occasion being Ben's first trip home since his epoch-making flight across the top of the world last April with Wilkins. Aviators from all over the state, Winnipeg and the twin cities of Minneapolis and St. Paul were on hand, and an aerial circus made up part of the program.

Eielson and Wilkins were presented with trophies and medals by the citizens of Hatton, the American Legion of North Dakota, and the Scandinavians of the state.

Eielson will accompany Wilkins on his proposed trip to the Antarctic this winter.

A DEVELOPMENT company, to be incorporated as the Air Service Associates, Inc., will be formed in Mott to develop the municipal airport, recently established by the American Legion post.

A hangar to cost $5,000 and a shop will be erected. The field will be lighted for night-flying.

A three-day air meet, to be held October 2, 3 and 4, will dedicate the field. This will be known as the Tri-State Air Show and will be sponsored by the Air Service Associates, Inc. North Dakota, South Dakota and Montana pilots will take part in the meet.

TWO aviation companies were formed the last week in July at Minot, N. D. —International Airways, Inc., and Northern Airlines, Inc.

THE International Airways, Inc., is headed by R. E. Barron, Dr. H. M. Erenfeld, Norman Eilison and R. J. Coughlin, all of Minot, and Senator J. W. Schnitzler, Froid, Mont., as the incorporators. Airplanes and accessories will be retailed by the company, which has purchased a Ryan brougham for passenger service and will add to the number of planes in service. This company is planning air connections with other North Dakota cities and with Winnipeg, Man.

NORTHERN AIRLINES, INC., of Minot, North Dakota, has secured the agency for Monocoupes, manufactured by the Mono-Aircraft Inc., of Moline, Ill., for the western half of North Dakota, and expects to organize a school. The company has also purchased a Lockhead Vega five-passenger cabin job and expects to connect with the transcontinental airline at Omaha.

A. W. Hugh is president of the company; J. C. Blaisdell, Jr., secretary and treasurer; and D. H. Bartholomew, vice-president.

THE Williston, N. D. Commercial Club has obtained a three-year lease, with an option to buy, on an 80-acre tract of land, located within the city limits to be used as a municipal landing field.

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NO ADDITIONAL FEE CHARGED. Letters provided with the usual Columbian Air Mail Stamps according to the tariff of the Colombian Airway System will be carried to Equador without additional fee.

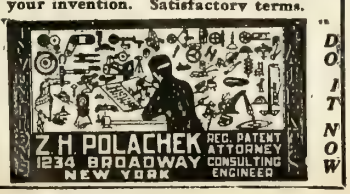
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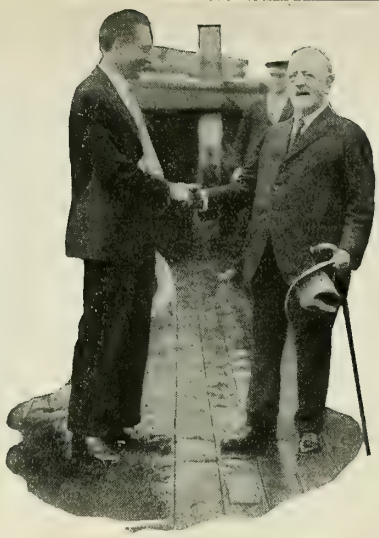
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For many years Commander Richard E. Byrd has carried the famous product of his friend, William Horlick, on his flights and explorations.

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FOREIGN AERONAUTICAL NEWS IN BRIEF

Compiled from the foreign aeronautical press, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

CANADA

News from Canada

By C. P. C. Downman

AN arrangement has been made with the Canadian Pacific Express, whereby the Canadian Colonial Airways, a subsidiary of the Colonial Airways in the United States, which has been awarded the Montreal-New York air mail contract, will transport packages by plane between Montreal, Albany and New York. This service, it is expected, will open in September.

Airdrome facilities at St. Hubert, Montreal's official airport, and at Albany are being arranged; at Newark, N. J., the southern terminus, beacons have yet to be installed, as the Montreal bound ships leave at 5 a.m. daily and the lights will be required for the take-off in winter. Passenger fares from Montreal to New York for the three-hour trip will be around $70.

THE famous transatlantic plane, the *Bremen*, on which Baron Huenefeld, Major Fitzmaurice and Captain Koehl successfully negotiated the east to west crossing of the Atlantic, has arrived in Quebec on board a steamer from Greenly Island.

The *Bremen* will be reassembled and placed on exhibition at the Quebec Exposition. It will later be sent to Bremen, Germany. A bronze tablet is to be placed on Greenly Island by the Clarke Steamship Co., Ltd., to mark the site of the landing of the *Bremen*. The Labrador people will affix it to a cairn now in course of construction.

THE question of the establishment of an airdrome in Quebec has been definitely settled and work was started on the new field early in August. The cost of construction will be $100,000.

The field will be approximately 2,500 yards in length and the same distance in width, will have six runways in the form of a star in order to take off with the wind at all times and will be equipped with up-to-date modern appliances, such as hangars, mechanics' huts, a weather bureau and searchlights for night landing.

British Columbia News

By A. F. Roberts

THERE are now four aviation companies operating or about to operate planes on passenger and express service linking Vancouver, Victoria and Seattle. Barnes and Gorst of Seattle, United States air mail contractors, give service between Seattle and Victoria with their Boeing B1D five-passenger cabin flying boat while B. C. Airways, Ltd., of Victoria, operates a trimotor Ford on the tri-city route, giving two departures daily from each city.

The Commercial Air Transport Co. of Everett operates a four-passenger Ryan monoplane on the Seattle-Vancouver run with a ten-minute stop at Everett each way. The Ryan flies north in the morning and south in the afternoon. Western Canada Airways, Ltd., of Vancouver plans to put two Boeing B1E seven-passenger cabin flying boats on the Vancouver-Victoria-Seattle run early this month.

THE Victorian Aero Club has started flying with the D.H. Moth which it received from the Dominion government and a large class of student pilots has been enrolled. Mr. Sydney Pickles, honorary secretary of the club, is instructor. The Aero Club of British Columbia, at Vancouver, has completed the qualifications for its Moth and expects to start flying under the government plan early in September. Capt. E. C. W. Dobbin has been named instructor with Mr. Sydney Parker, commander of the R. A. F. school of special flying at Gosport during the war, as chairman of the flying committee.

Western Canada Air News

By C. D. McCabe

POSSIBLY some of the American pilots will be interested in knowing the Customs Regulations for flying into Canada, in the vicinity of Winnipeg. At the present time there is no Port of Entry or official customs air harbor in Manitoba, although application for this has been made by the Winnipeg Flying Club, who operate the Stevenson Airdrome at Winnipeg. In the meantime the procedure to be followed is as follows:

Wire the Commissioner of Customs at Ottawa for landing permit, then advise the Collector of Customs at Winnipeg of the approximate landing time and place, so that the Customs Officer may be on hand to clear the plane. It is not necessary to get in touch with the Canadian Immigration Officers if the trip is to be for a short time only.

Should the pilot plan to come up and operate a plane commercially, it is necessary that his plane, if it is of American manufacture, have the Department of Commerce certificate, otherwise it cannot be used for passenger carrying in Canada. He will have to pay duty on his plane which amounts to about 35 per cent.

For any further information get in touch with Mr. J. E. Ross, Special Customs Officer for Aviation, c/o the Dominion Customs Office, Winnipeg.

MR. MICHAEL DE BLIQUAY, Instructor of the Winnipeg Flying Club, Stevenson Field, reports that with the week ending August 4th, the two Moth planes had made over 3,200 flights. The first machine was received May 28th, and the second June 30th, which makes an average of over 1,000 flights per month for each machine. There were only four days during the past month that it was not possible to take the air.

Canadian Air Express, Ltd.

THE Canadian Air Express, Ltd., of Toronto, Canada, is now operating at Toronto's new airport.

This new air harbor will be fully equipped and complete with a spacious steel-clad hangar, repair shop, gas, oil and service station. A large pavilion, with observation roof, has been erected for the comfort and convenience of the public.

The airport is located on an 100-acre farm on the east of Dufferin Street and north of Eglington Avenue, nine miles north and a little west of the City Hall, Toronto. The Canadian Air Express, Ltd., purchased this site with an option on another 100 acres adjoining to the south. Direct communication to and from the airport with the principal hotels in the city will be provided by the company's own motor busses. Mr. J. H. Neill is general manager.

The new company will engage in general air transportation, aerial photography and surveys, aerial advertising, and will also maintain an up-to-date school for flying.

Border Cities Air News

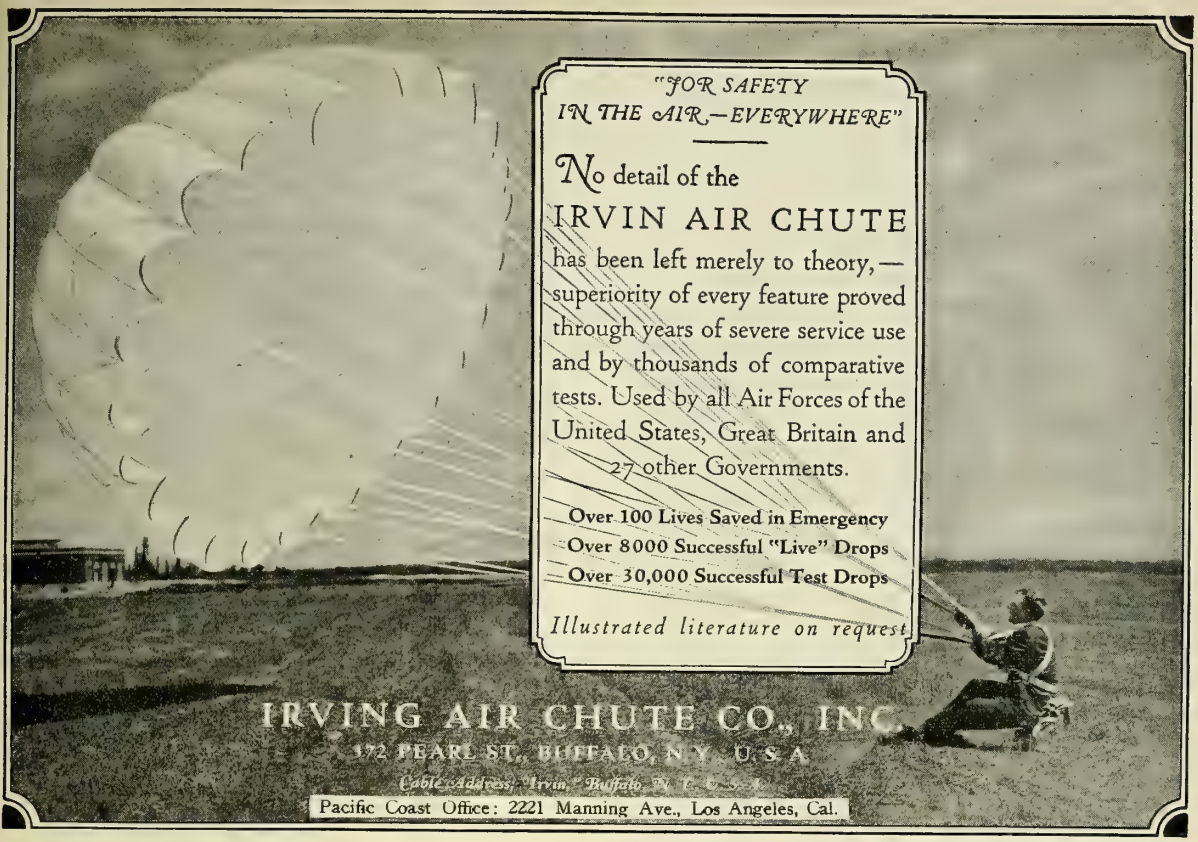
THE Border Cities, consisting of Windsor and her sister municipalities, are planning a program of aeronautical development which should very rapidly make this community one of the flying centers of Canada.

The Border Chamber of Commerce, with headquarters at Windsor, has taken the initiative. The Chamber has organized a local branch of the Aviation League of Canada, known as the Aviation League of the Border Cities. The Aero Club of the Border Cities is being changed into the Flying Club of the Border Cities in order to comply with the Federal regulations.

In coöperation with a local company, the Chamber has secured an airport 3,500 feet square, perfectly level and without obstructions of any kind. This field, known as the Walker Airport, is within six miles of the downtown section of Windsor and seven miles of downtown Detroit. The hangar is now being completed, and the field will be finished by September 1st. It is a public flying field and is under the control of, and will be operated by, the Aviation League of the Border Cities. The headquarters of this latter organization is in the office of the Border Chamber of Commerce.

A training school for pilots will be established immediately upon the completion of the buildings by the Border Cities Flying Club.

Walker Airport will be officially opened on September 8th and 9th. The opening ceremonies will take place on Saturday, September 8th, on which date the first all-Canadian airplane race in Canada will be staged. It will be open only to members of official flying clubs in Canada. The course will be around the borders of Essex County, approximately 100 miles. On September 9th the International Air Derby from Windsor to Los Angeles will start.

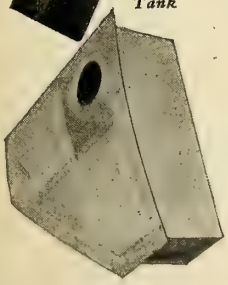


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FRANCE

THE air mail line from France to Buenos Aires, South America, has been operating since March last on a regular weekly schedule. The average time for the complete trip from France to South America has been from 10 to 12 days. The company will, in the near future, put in service between St. Louis, Sénégal, and Porto Praia, Islands of Cape Verde, fast two-engined seaplanes and between Porto Praia and Natal, Brazil, new fast steamers and it is expected the time will be cut down to 7 to 8 days by the end of the year.

The Compagnie Générale Aéropostale (Latécoère Air Lines) in collaboration with the French Government is investigating the extension of the line France-Senegal to link by an air mail line France to its African Colonies (Equatorial Africa, Congo and Madagascar). To this effect trial flights have been undertaken by Pilot Collet from Dakar, Sénégal, to Tombouctou, Sahara, and from Tombouctou to Kotonou, Dahomey.

This company has also submitted to the Portuguese Government a project to link Portugal to its African Colonies (Portuguese Guinea, Islands of Prince, San Thome, Angola and Mozambique) either through its line Tangiers (Morocco)-Dakar (Sénégal), linked on one side with Lisbon through a new air line Lisbon-Tangiers and on the other side by an extension from Dakar to the Portuguese Colonies, or through a line to be established Lisbon-Tangiers-Oran-Gao-Kotonou, Island of Prince-Island of San Thome-Kabinda (Angola), Sao Paul de Loanda-Benguela, and from Kabinda (Angola) or Loanda to Quilimane (Mozambique) through Elizabethville.

On July 21st the Compagnie Générale Aéropostale inaugurated an airline from Paris to Biarritz connecting with airplanes arriving from London, Belgium and Germany. Two planes leave Paris with passengers at 1:15 p.m. and after stopping at Bordeaux arrive at Biarritz at 5:45 p.m. The 441 miles are flown in 4 hours 10 minutes or at an average speed of 107 miles an hour. Planes are scheduled to leave Le Bourget Airdrome, (Paris), every Saturday at 12:45 and Biarritz every Monday at 6:30 a.m. This is the first link of a contemplated air mail line, Paris-Biarritz-Lisbonne-Azores-Bermudas-United States.

Lieutenant Paris' Flight

LIEUT. PAULIN PARIS, in the French naval seaplane, the *Frigate,* was prevented by motor trouble from taking off from Horta in the Azores for New York.

Lieut. Paris, accompanied by Mechanician Marot and Radio Telegraphist Cadou, was under orders to the French Ministry of Marine. The route originally planned was to take the plane from Brest to Horta, from Horta to the Bermudas or to Halifax, according to weather conditions, and then to New York. Actually only the first leg of the trip was flown,—from Brest to Horta. The *Frigate* took off at Brest on July 22 and landed at Horta 13 hours and 15 minutes later.

POLAND

The Polish Transatlantic Attempt

ON their east-to-west attempt to fly the Atlantic, the Polish fliers, Majors Louis Idzikowski and Kasimir Kubala were rescued by the German steamer *Samos* sixty miles off Cape Finiserre, Spain, after trouble with the oil gauge had forced their Amiot biplane to descend. Towing the damaged plane, the *Marszelak Pilsudski,* the *Samos* carried the aviators to Oporto, Portugal.

At the time of their descent, the aviators were heading back for European shores, having described a great circle out over the Atlantic. Having taken off from Le Bourget Field, Paris, at 11:46 a. m. Eastern Standard Time, August 3rd and having been picked up at 11:46 p. m. August 5th, the Poles were in the air nearly thirty-six hours. During that time they had been sighted by a trawler 60 miles off the French coast, by the Norwegian tank steamship *Aztec,* and finally by the steamer *Amakura.* They actually flew north of their intended course so that they were not sighted at the Azores as had been expected. The decision to return to Europe resulted from a suddenly falling oil pressure coupled with unfavorable weather conditions. Because they carried no radio, the world remained uninformed of the progress of the flight, and much concern was felt when they failed to arrive at their destination long after they were due.

The *Marszelak Pilsudski* was built by M. Amiot and was purchased in France for the pilots by the Government of Poland.

ENGLAND

The Courtney Flight

FIRE aboard his Dornier-Napier Whale caused by the breaking of a copper fuel pipe forced Captain Frank T. Courtney and his three companions, Fred Pierce, mechanic; Hugh Gilmour, wireless operator; and E. B. Hosmer, financial backer of the flight to descend abruptly in mid-ocean about 650 miles northwest of Horta, Azores. Courtney's flying boat which began its flight to America at Porto Tim, near Horta, August 1st was well under way when Pierce discovered the fire. After the descent to the surface of the ocean and while the other extinguished the fire, Gilmour sent out SOS calls on the short wave radio transmitter which were picked up by several Atlantic steamers. Immediately the ships turned from their courses to aid.

After the airplane had floated about for 18 hours, its occupants were picked up by the Atlantic transport liner *Minnewaska.* The plane, although still in excellent condition, was abandoned and Courtney and his companions were brought to New York.

Captain Courtney holds that the flight is an important demonstration of the value of the flying boat and of radio equipment in transatlantic flying.

A DURATION record for light airplanes is believed to have been established by Captain Hubert Broad on August 17. Using the latest type DeHavilland Moth with a new Gipsy engine of 85 to 100 horsepower, he ascended from the Stagg Lane airdrome in North London at 5:30 p.m. August 16 and flew about the country without any fixed route until 5:30 August 17, covering altogether 1,440 miles in 24 hours.

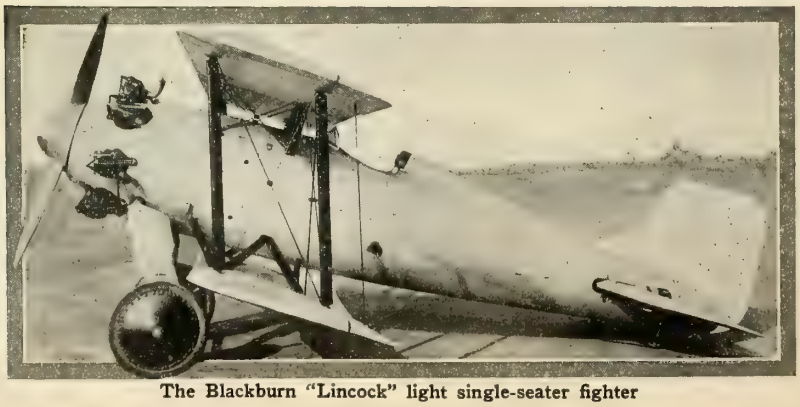
With extra tanks for fuel he started the test carrying 110 pounds more than the normal load and 80 gallons of gasoline. When he landed he still had sufficient gasoline for another four and a half hours.

The nearest unofficial light airplane record to that of Broad was the thirteen-hour flight of Bert Hinkler from Croydon to Rome on his flight to Australia.

A PAMPHLET containing air navigation and aircraft rules in parts of the British Empire has been published. Copies are available through the office of the British Library of Information, 5 East 45th Street, New York, N. Y., for twenty cents.

THE Blackburn "Lincock" light single-seater fighter is designed to carry out the same duties as the heavier and higher-powered type of single-seater fighter usually employed for aerial offensive action, escort duties and offensive from the air against ground forces, but being of lighter construction the "Lincock" is more maneuverable and, although fitted with an engine of less power, attains in all other respects a performance nearly equal to that of the higher-powered class.

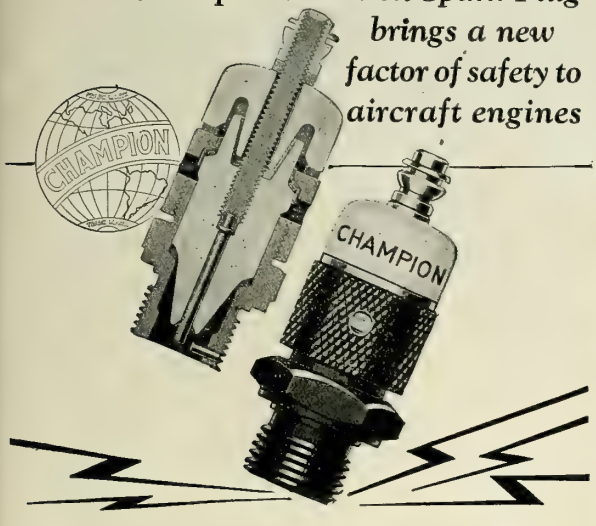
Aircraft of the "Lincock" type can also be adopted with advantage for certain civil purposes such as fast mail-carrying, police or customs patrol work, the military load being replaced by an equivalent weight of mails or extra fuel as required.



The Blackburn "Lincock" light single-seater fighter

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PARIS AERONAUTICAL SALON

by H. C. Schuette

Asst. Trade Commissioner, Paris.

THE eleventh Salon de l'Aviation, held at the Grand Palais in Paris from June 29 to July 15, 1928, could be characterized chiefly as an indication of a trend in the same direction as that taken by the last aeronautical show in 1926—namely, a preponderance of monoplanes, all-metal construction, air-cooled motors, and comparatively little in the way of technical improvement. As evidenced by the last show, the world is still waiting for the "perfect model" plane.

The salon marked the entry of American participation in this annual event. Two American companies were represented at booths displaying their products, while about 15 others showed photographs of their planes and equipment at the booth of the American Aeronautical Chamber of Commerce. The composite display of the members of this trade association was arranged in a large booth situated on the ground floor and attracted considerable attention from the visitors to the show. The individual booths of the other two American companies on the first balcony also recorded a large number of visitors. One of these companies showed a motor and photographic apparatus, and the other displayed a line of parachutes. In addition, four American oil, paint, and spark-plug companies displayed through their French branch companies or distributors.

A significant feature of the show was that practically all European manufacturers of water-cooled engines, with the exception of Rolls Royce, brought out air-cooled motors. A number of companies, notably Farman and Potez, have adopted American technique in airplane design in patterning their machines after an American type successful in a trans-Atlantic flight. Renault has also brought out an engine similar to that of the Wright Whirlwind type.

The Hispano-Suiza Co. displayed a well-known type of American engine, for which it has recently concluded arrangements to manufacture locally under license.

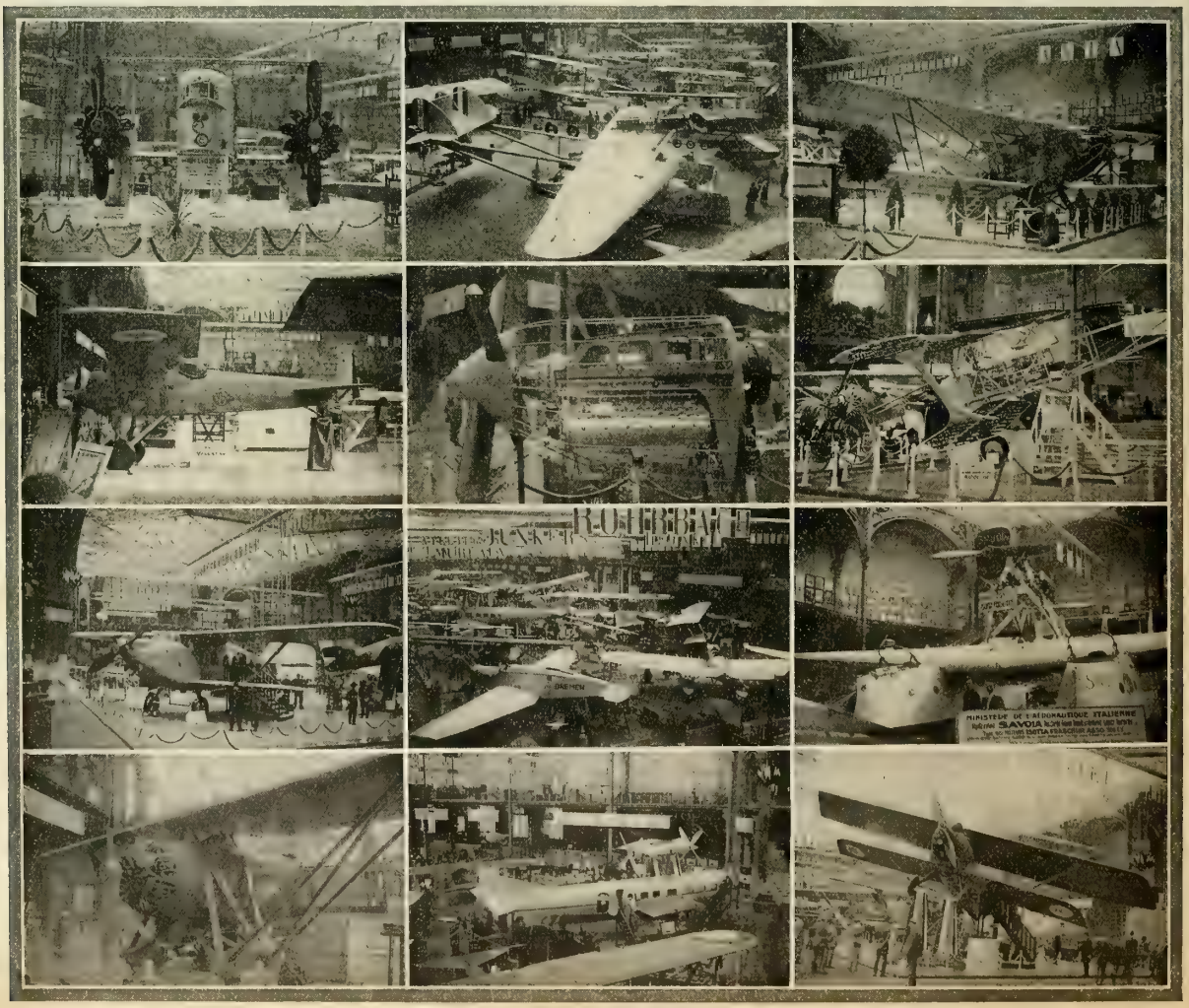
Three French governmental departments had displays at the show. The "Direction Générale de l'Aeronautique" of the Ministry of Commerce, and the Ministry of Marine showed engines and various types of equipment, and the Ministry of War had the most extensive exhibit in the show.

The exhibit of the Italian Government consisted of two seaplanes and one airplane, including the plane of de Pinedo and the plane of Major Bernardi, holder of the world's speed record (512 kilometers an hour). The airplane exhibited was a Fiat observation plane.

In the German group were such companies as Arado, Dornier, Rohrbach, Heinkel, Albatros, Focke-Wulf, Udet, Klemm-Daimler, and Junkers. The last-named company showed a plane of the *Bremen* type. Klemm-Daimler showed a small touring plane with a 20 horsepower Mercedes engine geared 3 to 1.

There were a number of large, comfortable commercial planes, including a huge bimotored Farman particularly adapted for night flying, powered with two 500-horsepower motors.

(*Continued on next page*)



Views of representative exhibits at the 1928 Paris Aeronautical Salon.

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The "Aviator" $2



A Marvel of Lightness and Strength

Your Name ETCHED FREE on Handle

You have never seen pliers like these!

YOU boys who work around planes know the need of skill and precision. That's why we designed the "Aviator"—to put into your hands a pair of pliers that would match up with the high standards of workmanship required in your profession.

The "Aviator" is a precision tool, built with the utmost skill, to enable you to get quick and positive action on a wide variety of jobs.

In spite of its slender proportions, the "Aviator" has the strength of ordinary pliers twice its weight—due to scientific designing—and also because it is hammer forged from special analysis electric furnace tool steel, oil tempered and hardened *thru and thru*—NOT CASE HARDENED (surface hardened only).

No loss of strength or gripping power in the long tapered nose, which enables you to get into cramped corners. The powerful cutters of the "Aviator" remain in alignment and retain their cutting edges. Slide joint permits adjustment for nuts, bolts and rods of small and large diameters. Heavily nickeled over copper. *Guaranteed to give the owner 100% satisfactory service.*

The "Aviator" is a Member of the Famous Family of

Vacuum Grip PLIERS

REG. U.S. PAT. OFFICE

Over Half a Million in Use



Aviator's Kit (including the "Aviator") Set of Three, $5.75

An outfit that takes care of practically every operation on an airplane where pliers are needed. Set of three pliers in durable leatherette case, lined with purple velvet. Your Name Etched FREE on handle of each pair. Every flying man and aeronautic mechanic should own this kit. ORDER BY COUPON. Pliers may be purchased separately, if desired, also by coupon.

Descriptions and Prices (left to right)

No. 67—The "Aviator" (described above). Length 7". Price $2.00. No. 196—Long Reach Needle Nose for the hard-to-reach places. Side wire cutter; spring-tempered. Length 6½". Price $1.85. No. 186—Diagonal Cutters. Very powerful. A useful tool that every mechanic needs. Length 6". Price $1.90.

TO PURCHASING AGENTS: Order a few pairs of the "Aviator" No. 67 for your men to use in running tests. It will pay you.

FORGED STEEL PRODUCTS CO
NEWPORT, PENNA.

DISTRIBUTORS — Nicholas-Beazley Co., Marshall, Mo. Air Associates, Inc., Garden City, N. Y. Johnson Airplane Supply Co., Dayton, Ohio.

FORGED STEEL PRODUCTS CO.
Newport, Penna.

Enclosed is Money Order for $5.75, for which you are to send me "Aviator's Kit" postpaid. (If individual pliers are wanted, use following form);

Send me Vacuum Grip No.....No.....

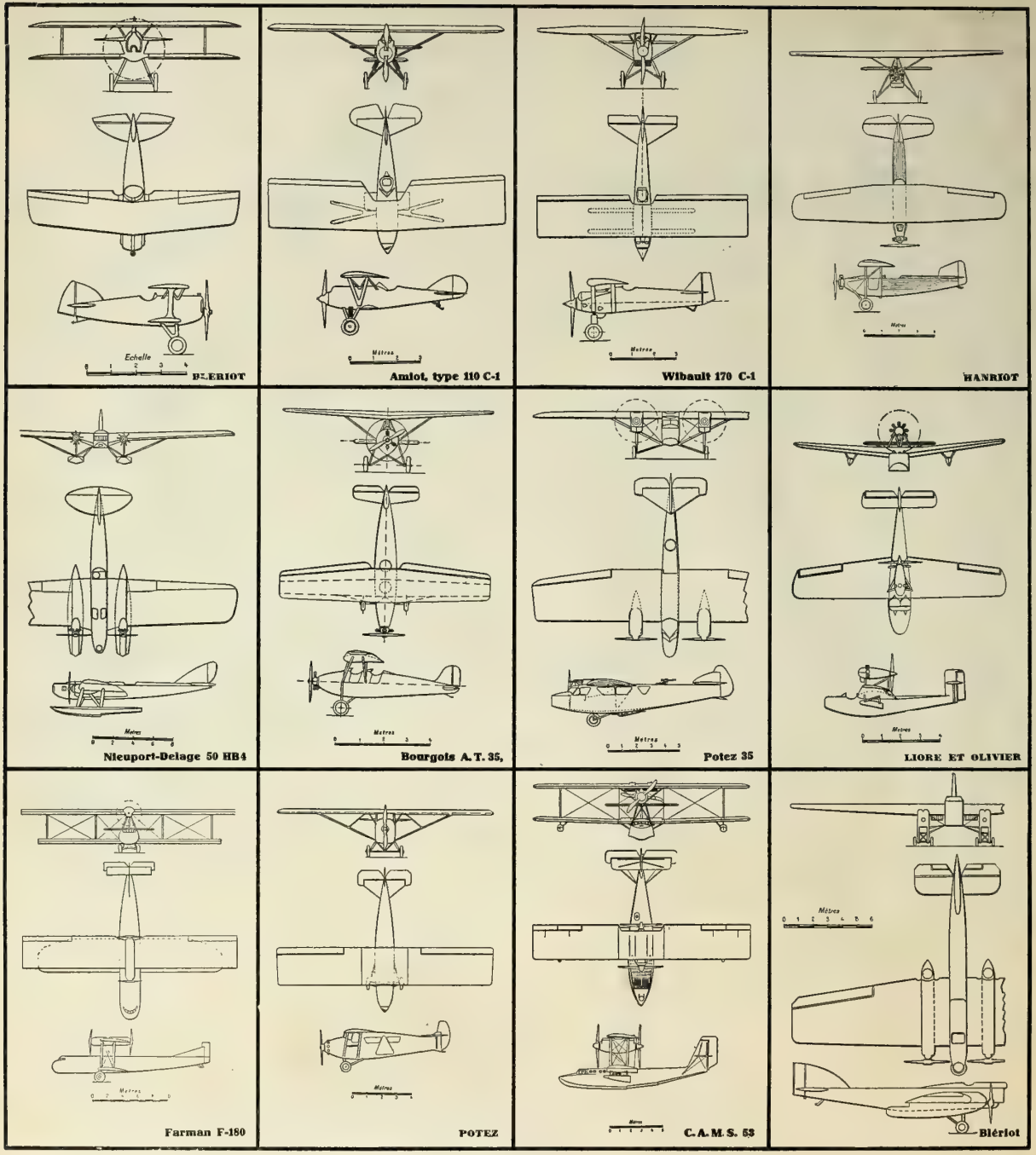
for which I enclose Money Order for $....

Name .....

Street .....

City ..... State .....

AD-9



Outline drawings of some of the French commercial and military airplanes at the Paris Air Show

The French constructor Breguet displayed the *Nungesser et Coli*, used by Costes and Le Brix in their round-the-world flight. This plane attracted much attention from the public.

Among the outstanding planes in the entire exposition was an English *Bristol* single-seater fighting plane. The machine is entirely of metal construction, except that the wings, tail surfaces, and fuselage are fabric covered and the plane is fitted with a Bristol-Jupiter radial air-cooled engine. The constructors claim it will rise to 20,000 feet in 11½ minutes and maintain a speed of 175 miles per hour at that height. The top wing is on a level with the pilot's eye and is cut away and made of a thinner section to remove the possibility of blind spots. Similarly the bottom wing is made smaller in chord and is cut away in the center to afford a vertical view downward and a good angle of view over the leading edge. From the wind screen the nose of the body slopes downward, giving a good landing view.

The weight specifications are: Machine empty, 1990 pounds; fuel, 70 gallons (imperial), 532 pounds; oil, 8 gallons (imperial), 75 pounds; military load, 528 pounds; total loaded weight, 3,125 pounds. The military load comprises pilot, parachute, 2 Vickers, and 1,200 pounds of ammunition, C. C. gear for two guns, gun sights, oxygen, electrical equipment, instruments, and wireless apparatus.

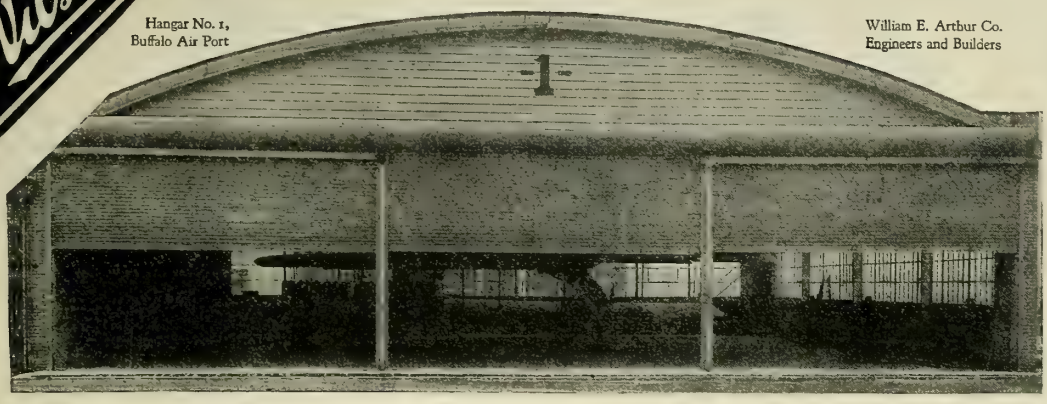
A number of the planes displayed this year were cut away to give a clear idea of the details and construction methods used. On this account the show was of especial value to designers and engineers as well as being educational to the average spectator.

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Hangar No. 1,
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William E. Arthur Co.
Engineers and Builders



Vital to the Properly Equipped Hangar

WILSON ROLLING STEEL DOORS operate in multiples by electric motor. Pressing a button raises or lowers all curtains simultaneously.

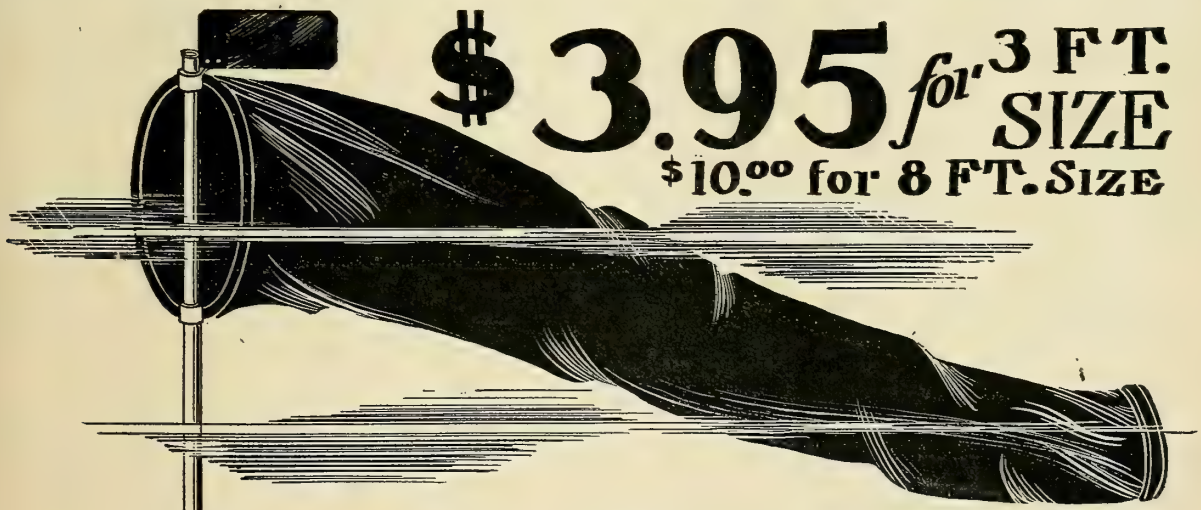
Economical and fool-proof, they are standard on all hangars designed to give maximum service.

Coiling overhead and out of the way, they give unobstructed opening—saving time and temper. No delays and no worries where Wilson Steel Doors are used.

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Carle Place **Nassau County, N. Y.**

Picked from the Air



AERO DIGEST will award a prize of $5 each month for the best humorous contribution published. Only those pertaining to the aircraft field will be considered. Address the "Picked from the Air" Department, Aero Digest, 220 West 42nd St., New York, N. Y.

Mrs. George A. Kurtz, Vandalia, Illinois, won the prize for September.

(Overheard at the aviation field)—

Flapper: "Gee, I wanna fly!"

Wisecracker: "Just wait a minute and I'll catch you one."

Aerial Pullmans

Names we may expect to see on the gondola cars of the super de luxe dirigibles in the near future, following the quaint custom of the honorable Pullman Company in naming its creations of the road after time table stops:

"Parachute Heights," "Contact Point," "Byrd's Egg Harbor," "Hegenberger Haven", "Maitland Mesa", "Vought View", "Varney Vista", "Sikorsky Swamp", "Boeing Green", "Fort Bombardment", "Ford Falls", "Rodgers Forks", "Pursuit Plains", "Rumpler River", "Goebel Groves", "Jensen Junction", "Waco Woods", "Compass Canyon", "Mt. Macready", "St. Amelia", "Elliott White Springs", "Elder's Ferry", "Koehl Corners", "Fitzmaurice Flats", "Huenefeld Castle", "Digest Downs", "Streamline Center", "Lindbergh Lake", "Mitchell Court House", "Wilbur Bottoms", "Cumulus City", "Fokker Crossing", "Amphibianville", "Mackayport", "Levine Landing", "Caldwell's Bar" and "Balloon Hollow". —*Kenneth D. Stern.*

JACK LYMAN, operator of the San Diego field for the Maddux Airlines, is nothing if not polite. But yesterday there came to the field a visitor fresh from a trip to Europe, whose remaining mission in life apparently was to impress the home folks of the antiquity of our ways.

"Why, heavens, what are all those things sticking out in back of that airplane?" she asked Lyman. "Now in Europe, and I flew all over it, we had all such things inclosed."

"That's the rudder, the tail," Jack explained.

"Well, I never saw the like. And, as I say, I rode all over Europe," she continued. "I think what we used were something called DHs."

"No, madam, I think you used a balloon," Jack answered.

—*T. P. Mathews, Director of Publicity, B. F. Mahoney Aircraft Corp.*

A Narrow Escape

Embryo Aviator (in the midst of a dizzy spiral): "Heavens, Wilbur, just look at the earth."

His Even Embryoer Associate: "Mercy, Oswald, it's lucky we got away when we did, it certainly is acting strangely."

—*Leo Swoiskin.*

An Irish mechanic listened as an airplane flew overhead with the motor missing. He turned to his helper standing near him and said: "Shure, if that kapes up it must come down." —*Patrick M. Salisbury.*

A big husky farmer and his hired man were at the landing field to take their first ride in an airplane. They had previously planned to go up together but when the hired man saw another plane which took passengers up and did various aerial maneuvers, he decided that was the plane for him. The farmer insisted that he wanted just a straight ride and went up alone while the hired man went up in the stunt plane.

The plane carrying the hired man landed first and after coming to a stop the pilot noticed that his passenger was not very active, whereupon he went to investigate.

He found him in a rather mixed up position in his flying suit, helmet and goggles and shaking like a leaf due to his lost equilibrium from being upset so many times while participating in the pilot's acrobatics. With the aid of the curious and otherwise at the field, the pilot removed his passenger from the plane and placed him on the ground.

During the meantime, the farmer's plane landed and he was broadly proclaiming, upon emerging from the cockpit, that, by crackie, that was the best ride he ever took. He walked over to the stunt plane to procure from his hired man the high points in stunt flying, whereupon he found his able assistant lying dumpishly on the ground.

"What's the matter, Ben?" he inquired, feeling himself raised to the state of preeminence by his own successful flight, "didn't you have enough gumption to last through all those flip flops?"

"Gumption! By gol, I had a plenty, but somehow I couldn't keep up with it up there, but I am all caught up with it now."

—*Lydia Netzel.*

No Progress There

Wife: "Fancy, Robert, in a few years we shall be able to fly to London in half an hour."

Husband: "But you will still need two hours to get ready." —*Weekly Scotsman.*

The fourth grade had been studying the poles in class.

Teacher: "Johnny, what is it that lives near the poles. It is white and its name begins with a B?"

Johnny: "Oh, yes, I know, teacher, Commander Byrd." —*Gordon G. Dodd.*

Instructor to student: That was very poor flying. I was doing most of it myself.

—*Rollin J. Fairbanks.*

After a Ground School Lecture

Instructor: The altimeter depends entirely upon atmospheric pressure.

Student: Well, when I made a landing today—er—rather suddenly, I would have sworn it depended on some magnetic attraction about 200 feet below the earth's surface.

—*Ruth Ingalls.*

It was at a seance. Mme. Fevrier and her guests formed a circle. The lights went out. A few moments later the guests heard Mme. Fevrier murmur, "There is a great presence now in the room. Shall I ask it to identify itself?"

"Yes," chorused the guests, and in answer to Mme's. query a deep, sepulchral voice boomed out. "I am the Spirit of St. Louis."

—*Russell Gard.*

The lion that Brutus and Rastus were transporting in their plane had gotten loose and had taken up quarters in the tail.

Said Brutus: "Rastus, you-all got to git that lion back in he's cage befoah we lands. Jes' open up de doah to de cage and ease him in. De ownah said he so tame he eat offa youah han'."

"Yeah," said Rastus. "He look like he like to eat off my foot, too."

BETTER AIRPORTS
WPM
AND ASSOCIATES

"GROUND POCKETS"

"Air pockets" exist only as a term but "ground pockets" are a stern reality. Hidden beneath innocent, solid-looking surface soil of an airport, they are a menace to aviation which may exact toll tomorrow, next year or in the remote future.

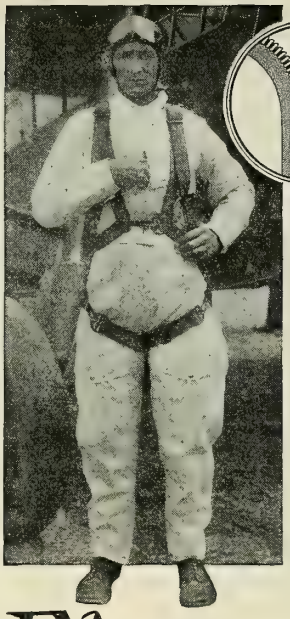
Only modern, scientific, highly specialized soil drainage engineering methods such as practiced by this organization can prevent the miry surface or tricky sub-soil which cause wheels to sink in and planes to nose over.

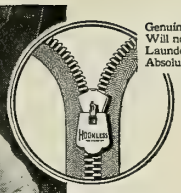
On large recreational areas and golf courses the cost of poor or inadequate drainage is merely human inconvenience. On the airport it is thousands of dollars in crashed equipment and—too often, lives. The cost of one crack-up will often pay for permanent, effective airport drainage. The value of one life is not to be compared.

An important phase of our engineering practice is the study of soil types to determine water carrying capacity of types of vegetation to help maintain a smooth, even field, resist tail skid abrasion, landing and taxying scars, and to assist water shed.

Working co-operatively with designers, contractors and airport engineers, we are ready to apply the drainage knowledge we have acquired in connection with some of the leading drainage engineering achievements of the country. Consultation without obligation.

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Columbus, O.





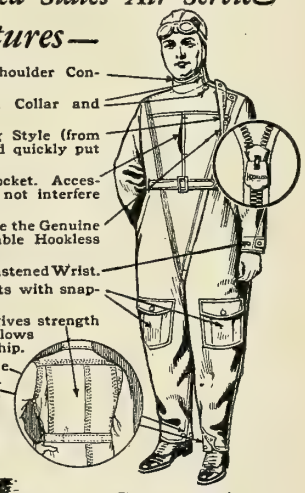
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Special Snug-Fit Collar and Shoulder Construction.
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The Popular Lee Side-Opening Style (from shoulder to crotch) easily and quickly put on or taken off.
Large Double-Opening Center Pocket. Accessible with either hand. Does not interfere with parachute harness.
Lee WHIZIT Flying Suits feature the Genuine Rust-Proof, Jam-Proof, Washable Hookless Fastener.
Close-fitting, Adjustable Snap-Fastened Wrist.
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Box Pleat, Yoke Construction gives strength and smart appearance, and allows free movement in controlling ship.
Leg Bottoms, fitted with Genuine Hookless Fasteners, open and close for snug fit over footwear.
Extra full through hips, ample leg room, very comfortable. Neat and Trim.

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The Shelton Looms
395 Fourth Avenue
New York, N.Y.



TRADE MARK

AVIATION PROGRESS

(*Continued from page* 417)

increase in the volume of air mail transported under the new rate, although it has been in effect only since August 1.

Statistics for the amount of mail carried in August are not yet available but in several cases extra planes have been needed to handle the added mail. Even under the old rate there has been a steady increase in volume. In June 1927 there were 130,115 pounds carried. In June 1928 there were 209,775 pounds carried. The Post Office authorities have estimated that there will eventually be a 300 per cent increase in the air mail because of the new rate.

The air mail service has been the backbone of the air transport system and the new rate will make it even more important. Its organization has long been recognized as a sure indication of the state of the whole industry. These gratifying accomplishments cannot but point to the most favorable situation for 1929 and for the years to follow.

COAST TO COAST IN 18 HOURS 58 MINUTES

(*Continued from page* 428)

By Col. Arthur Goebel

course there was a certain thrill for both of us in realizing that the *Yankee Doodle,* our Lockheed Vega monoplane, with its 400 h. p. Pratt and Whitney nine-cylindered, air-cooled Wasp engine, a commercial job bought in the open market and neither built nor altered especially for this trip, had broken all records.

In this flight there is a certain significance—that anyone who has the price can buy straight commercial equipment in the open market and with it cross the continent of North America in less than a single day.

Naturally I am all for the Lockheed Vega. One of the first models was purchased by Sir Hubert Wilkins and he will use another, similar plane, although it will be equipped for water landings, in his Antarctic exploration work which is to begin presently. It offers little or no parasite resistance, being free of wire struts.

The wing is full cantilever type, internally braced, covered with plywood, thick at the center. The fuselage is full streamline, molded under pressure, of laminated strips of veneer and glue. The wing spread is 41 feet, length over all 27 feet 5 inches and a weight empty with this motor 2,050 pounds—cruising speed 135 miles with a top speed of 170 miles.

(*Continued from page* 428)

By Harry J. Tucker

heed Vega people who told me that any one of their stock planes would meet all my requirements. I forthwith ordered one. A careful study of available engines led me to decide on the Pratt and Whitney Wasp.

We soon were ready and in the early spring hopped off for our first try, but we were forced down by fog in Columbus, Ohio. This did not disprove the efficiency of the plane as a medium of travel, it merely prevented a non-stop flight. As that is what I was trying for, we flew back to Los Angeles.

The other day we made our second start and completed the non-stop journey to New York from California in 18 hours and 58 minutes—a pleasantly comfortable and perfectly safe trip.

Anybody else who is willing to spend enough to secure the necessary equipment can have the same facilities and with them do the same thing—or something else as interesting or important.

HIGH SPEED
NON-GRAN
BEARING BRONZE

TO THE AIRCRAFT MOTOR
AS THE JEWELS
TO A FINE WATCH

MADE especially for Aircraft Engines, NON-GRAN is given a tough fibrous structure that makes it almost immune to wear. In service NON-GRAN develops a hard glass-smooth bearing surface that reduces friction and oil consumption to a minimum. Make sure your engine is bushed with NON-GRAN and avoid trouble.

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WHAT THIS PILOT KNOWS for—

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CHIEF PILOT CLEVENGER, out of the wealth of his 10 years' flying experience, explains in simple, interesting language, every movement of the controls for take-offs, landings, straight flight and aerobatics in his nationally famous instruction book—
"..... .. MODERN FLIGHT ...."



STUDENT PILOTS and young men about to enter the game can cut down the number of hours usually necessary before soloing through the wise investment of One Dollar.

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Gentlemen:
Rush copy of Clevenger's complete flying course.

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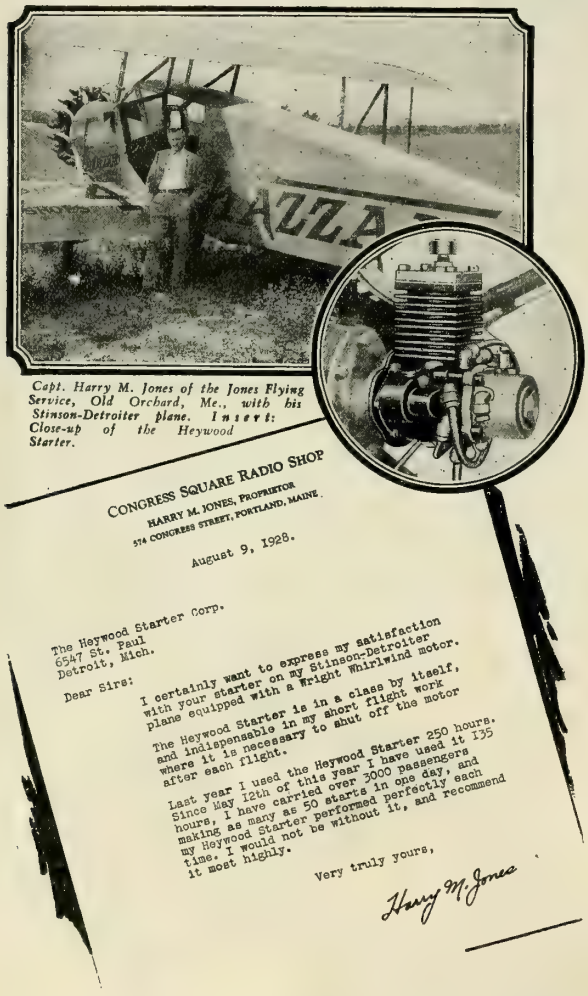
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Capt. Harry M. Jones heartily O.K.'s HEYWOOD STARTER



Capt. Harry M. Jones of the Jones Flying Service, Old Orchard, Me., with his Stinson-Detroiter plane. Inset: Close-up of the Heywood Starter.

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HARRY M. JONES, PROPRIETOR
574 CONGRESS STREET, PORTLAND, MAINE

August 9, 1928.

The Heywood Starter Corp.
6547 St. Paul
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Dear Sirs:

I certainly want to express my satisfaction with your starter on my Stinson-Detroiter plane equipped with a Wright Whirlwind motor.

The Heywood Starter is in a class by itself, and indispensable in my short flight work where it is necessary to shut off the motor after each flight.

Last year I used the Heywood Starter 250 hours. Since May 12th of this year I have used it 135 hours, I have carried over 3000 passengers making as many as 50 starts in one day, and my Heywood Starter performed perfectly each time. I would not be without it, and recommend it most highly.

Very truly yours,

Harry M. Jones

Captain Jones and all who have had commercial flying experience realize the absolute necessity of reliable, efficient equipment.

The Heywood Starter, adaptable to practically all engines used in modern aircraft, meets every requirement. Positive, instant starting regardless of weather conditions, by simply touching starter button located in pilot's cockpit.

Complete details of Heywood high-pressure injection starter on request.

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The* HEYWOOD STARTER *Corp.

6547 St. Paul Ave., Detroit

CALIFORNIA SETS A PACE IN THE AIR

(*Continued from page* 466)

and Lincoln Beachey. These non-rigid ships were powered by a tiny air-cooled engine installed in a light triangular framework suspended beneath the gas bag. To ascend the pilot walked to the rear, thus pointing the nose up. The propeller did the rest—as best it could. Descent was accomplished by the reverse process. About forty soldiers were detailed to help in landing, and spectators were greatly amused at the confusion and stentorian orders involved in bringing one of these clumsy bags to earth.

Los Angeles having thus established itself as an aviation center, other adventurers were attracted thither. Soon after the initial air meet, Cal Rogers made his famous, if intermittent, first transcontinental flight from New York City. Three months were consumed in the trip, and the plane was entirely rebuilt before it reached Los Angeles. Backed by the wealthy manufacturer of soft drinks, no expense was spared to make the flight a success. A special train was equipped with repair shop, hospital, photographic dark room, press headquarters and living accommodations for the formidable staff of physicians, surgeons, nurses, mechanics, reporters and so on. The doughty Rogers broke ribs, arms and legs before he arrived—often resuming his flight before his injuries were completely healed. Time after time he narrowly escaped death; crashing in cornfields, forests, villages, but always making repairs sufficient to get in the air again, and covering a few miles till the next crash.

Prominent in the annals of local aviation is Dr. Ford A. Carpenter, F.R.G.S., who has spent a lifetime in the service of the U. S. Weather Bureau, in Army and Navy air maneuvers, and in countless other activities associated with the conquest of the air. Dr. Carpenter has charted air routes for many famous flights, and piloted the first dirigible to cross the continent, the U. S. C-2, covering the 3,200 miles from Washington in 66 hours, arriving here on October 10, 1922.

Pioneering with balloons also has its place in Southern California's air history. Edward Sorver, of Pasadena, graphically describes one of the first ascents:

"We brought to Pasadena the racing balloon *America*, which had carried off first honors in the international races in St. Louis, and had it inflated with natural gas, running a special main to Tournament Park. Capt. Mueller, a German expert in aeronautics, was the pilot. At first just he and I were going to make the ascent alone, but at the last moment took C. K. Meyers and F. E. Martin with us. This was in March, 1909.

"This was, as far as I know, the first free balloon ascension, outside of carnival attractions, in Southern California. We had no instruments in those days, and when aloft released strips of tissue paper to determine our direction. If the paper dropped, we knew we were going up; if it floated up past us, that indicated we were descending. We must have reached 10,000 ft. that first flight, as we were nearly over Mt. Baldy. Just before the ascent, Prof. Thaddeus S. C. Lowe, former head of the U. S. War Department Bureau of Aeronautics, and the oldest sky navigator living, shook hands and said the ascent would have reached international recognition in his time. We were in the air from 3:30 to 9:30 p. m., landing near Pomona."

We have come a long way in eighteen years, but first steps must be taken, and that exhibition of frail "flying machines" at Los Angeles in 1910 was an important milestone in California's air progress. Since that historic event Los Angeles became the terminus of the very first transcontinental flight; here was the starting point of the first—and at this writing, the only circuit of the globe, with Douglas cruisers designed and built in Santa Monica; San Francisco launched the Honolulu flights, and the amazing achievement of the *Southern Cross* to Australia. Los Angeles produced the Lockheed plane in which Captain Wilkins crossed the top of the world, and it is little more than a year ago that Lindbergh, in a San Diego plane, made his epochal flight across the awful solitude of the Atlantic. Commercially the Western Air Express of Los Angeles was the first enterprise of its kind to declare a stock dividend, and its clean flying record is still unapproached.

Early experiences in the science of aeronautics have greatly influenced our "air-mindedness" here in California. The state has since become one of the country's greatest fields for research and practical application of the use of aircraft.

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—on your hangar doors provide benefit in use—

Easy rolling movement of doors, either opening or closing.

One man-power is more than sufficient for the largest doors.

Full clearance of openings.

Exceptional weather tightness.

Elimination of troubles usually caused by rain, sleet or snow.

Minimum maintenance owing to use of Alemite lubrication on all moving parts.

Minimum loss of heat.

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Planning Service

Allith engineering staff will gladly assist in the design, construction and manner of handling your hangar door problems to provide installations that will exactly suit your needs—without obligation.

Booklet *D* features some definite ideas in actual use. May we send it to you?

Allith-Prouty Co.
Danville Illinois

SCHOOL BELLS AGAIN

(*Continued from page* 425)

work of the centuries and to weigh the wonders of the world with understanding. They will train him as best they can to carry on the destiny of the world. They will try, in a few short years, to repeat in him the long story of man's struggle up to what we call civilization. They will try to make of him a Modern Man, whose origins are deep in the past, whose feet stand firm in the present, and whose eyes look to the future.

For you see, you boys of the schools, you are literally sitting on top of the world. The long past leads up to you, and the endless future lies beyond you. Both meet in you, for you yourselves are the present, which is the only thing that is real. And the reason we parents and teachers worry our heads over you and spend our money on you and give you the best we have of health and hope and opportunity and training, is that we know that pretty soon you will take over this old world and run it for better or worse. And we don't want you to make any worse job of it than those who went before you.

So go into your schoolrooms and libraries and look around, and there you will see what the past has given you. Look around you at the world you live in or read its story in the newspapers, and there will you see the present. Look at your own hands and into your own heads, and there you will find the future.

What has this to do with aviation? It has everything in the world to do with it.

There's no man in this world wise enough to tell you why things happen when they do. That man would someday fly was a certainty, as soon as he had discovered the wheel and lever and learned the power of fire. But as it happened aviation was old Father Time's special birthday present to the Twentieth Century,—to your century. If you like, aviation was made for you, and History is now watching to see what you will do with it. Just at present nobody really knows exactly what it is good for nor what the future will make of it. Some think they do and some say they do, and some talk a lot of bigger planes, bigger loads, higher speeds, longer distances and so forth, but between you and me and the Sphinx of Egypt there's no telling for sure what will come of the new gift of flight. We do know that it will pull the world apart and draw it together again. We know it will change our habits, our ways of doing business, our making of war and our working for peace. We know it will change our geography, our sense of boundaries, and our feeling for distance and time. It has done all these things already. But just what strange wonders it will work with our civilization, as did the railroad and automobile before it, is hidden round the corner of time. And since men cannot see round corners none of us can do much better than guess as to the future of flight.

You boys are going to find out. More than that, you are going to have a hand in it, and those of you who are studying aviation today, even if you do no more than read about it, have already got a head start over your own generation. You have a toehold on the future; your eyes are set forward, as they should be. You are already staking out a claim on the Age of the Air.

Take that idea back to school with you this fall, and see if it doesn't help to put some spice in the old grind. Try to think of yourself as a citizen of Tomorrow, who will be a different—and we hope a better—sort of citizen than any of his ancestors. And consider your high-school days as a kind of ground school for the big job that lies ahead of you.

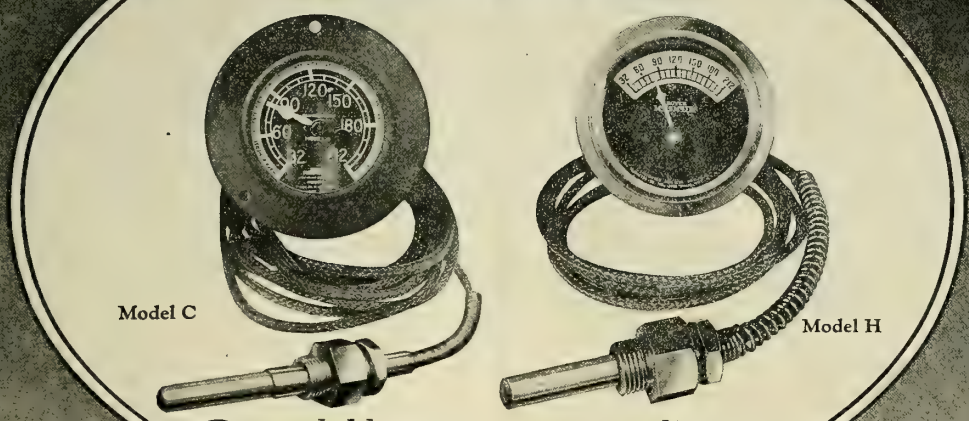
It's hard, sometimes, to see where the stuff they give you in school can ever have any real use for you. But that's where you make a mistake. Never mind about what you will do with your education after you leave school,—I've told you already that you will forget most of it. The time to make it work for you is now. Use your studies to build your courage, your determination, your imagination, your self-control, your confidence in yourself. Let them teach you to fly a straight course, to buck bad weather, to meet your schedules. You can get a kick out of Latin or Ancient History or even Mathematics if you tackle them in that spirit.

For one thing is certain,—you learn nothing unless you make it work for you. Useless knowledge is no knowledge at all, and in

(*Continued on next page*)

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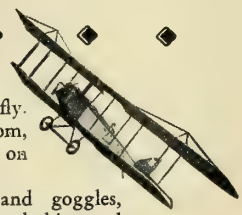
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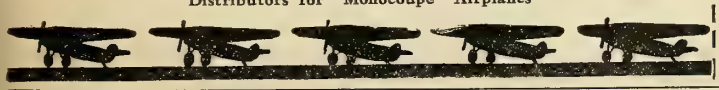
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(*Continued from preceding page*)

the long run nothing will stick to you that hasn't been made useful to you. You have to hitch some muscle to your brain to make it of any service to you or to the world in which you live. Merely filling your head with facts won't give you much more than a headache, and certainly won't make a man of you. Down in the land of cotton they have a saying to the effect that "High learnt niggers ain't much use at rolling logs", and you want to remember that the world needs workers who know how to think,—not highbrows who don't know what it's all about.

Another thing. Don't get high-hat with any of your studies because you think they don't fit into your ambitions. Mighty few of us really know where we are going. You may intend to be a bishop and turn out a bootlegger; you may aim to become a pilot and find yourself a plumber. I taught Latin for 14 years, and wondered quite a lot just what good it was doing me or anybody else. Now that I'm making a typewriter sit up and beg for my living, I have discovered that the fact that I can read Latin helps me to write English, and that old Julius Caesar himself sits at my elbow while I hammer out sentences. I left high-school myself at the advanced age of 13 and went to work; I walked four miles to and from my job every day. To fill the time I read books, and learned to dodge lamp-posts and pedestrians with astonishing skill. That was better than 25 years ago, and today the reading I did then is helping keep me out of the poorhouse. All sorts of chickens will come home to roost some day, so take what they hand you at school and make the best of it.

But above all, keep your eyes on the future. School teachers and old folks get the habit of looking backward, where most of their lives lie, but your own life lies in the other direction and that's where you should be looking. And those of you that love aviation and believe in it can be fitting much of what you learn into the pattern of the future,—the future which will owe so much to the mastery of the air. You can go pioneering in your studies now, so that one day you will be ready for the real thing. For the age of pioneers is never over but they must always find new trails, and the trails of the next generation lie in the sky.

I guess that will be all for today. See that you wash behind your ears and beat the bell into the school yard. If you can't make a good job of a five-hour day at school, you'll never make a mail pilot.

AIR—HOT AND OTHERWISE

(*Continued from page* 418)

a chain of mountains or a river or a little sea between it and some possibly hostile neighbor, were so differently situated from those on this side, that the raids of then did not impress Americans so very much. But now—well, those London raids may well give the United States a subject for intensive thought. For—"

And then he recapitulated some of the things which have occurred since the grim years to increase the efficiency of aircraft in peace or war. Lindbergh flew across the sea as easily as the Germans flew from Berlin to London. Goebel spanned the continent, from Pacific to Atlantic, in less than 19 hours.

And there have been many other episodes—all backed by great individual determination, to be sure, and pushed by brave and fearless men, but each far short of what conceivably might be done in desperate war time when life has no real value except that of its sacrifice for patriotism, when money has no value except that which it demonstrates when spent for patriotic purposes and when every mental impulse of every decent man and woman must be devoted to endeavor to defeat the enemy and preserve the homeland at whatever, even at the supreme cost to the individual.

The fighting planes of now are so much more effective than the best of the World War days that they seem almost like a different breed of war birds. Fliers are far more skillful. Explosive are more terrible. Gases are more deadly. And as for capacity for speed and distance—there is no comparison.

Those real air raids of the years of actual conflict insured that Englishmen and women truly would appreciate the terrible significance of the sham attack on London made a week or two ago.

It would be well for the United States to strive for an accurate

(*Continued on next page*)



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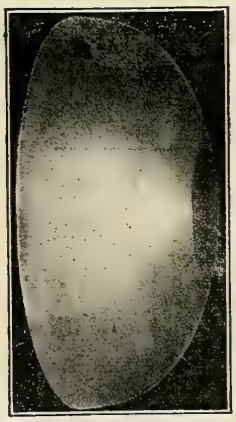
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(Continued from preceding page)

imaginative picture giving a full appreciation of the value of air effort by many and perfect planes and a plentiful trained personnel, and, also for a full appreciation of the grim necessity of competent air defense—which again means many and perfect planes and a plentiful trained personnel.

London was dismayed by the real peril indicated by the mock attacks.

AERO DIGEST does not expect another war within three years. It fearlessly predicts, however, that within three years New York city will be as readily reachable by possible enemy planes from any part of Europe as England was by planes from Belgium in 1914-15-16-17.

After these recent exhibition raids were over, Lloyd George declared they showed the absolute impossibility of defending cities against air attack. We do not agree with him. But we maintain that cities cannot be safeguarded against air attack by any except air defense.

In olden days only cities on the coasts or land boundaries needed to worry. All others could be defended by forces stubbornly opposing slow and laborious enemy advances upon ground level.

Now—enemy advance is virtually instantaneous (less than nineteen hours Los Angeles to New York, please remember), can come from any distance (don't forget Lindbergh) and every human being, man, woman, and child, not alone the fighting forces of a nation, is being exposed to direct possible attack.

Suppose the United States should go to war with Russia (to be absurd); that celebrated Muscovite aviator Snuffopopoffski could snuff at noon in Petrograd and easily popoffski the next day from the Aleutian islands with a cargo of bombs for San Francisco which he could drop and then return to the Aleuts without a landing.

This is to conceive a most improbable but easy feat. More likely ones might devastate the whole Atlantic coast, the southern half of the Pacific coast and any part of the interior.

The sham raids on London have had a powerful effect upon the English public mind. The Royal Air Force will get what money it requires. We cannot stage anything to have a similar effect in the United States because there is not in our public's mind any background of experience with modern war and its actual horrors. War is unreal to the average American. It is real—and terrible—to the average European.

London was "in ruins" theoretically when the raids ended. Theoretically 250,000 residents of the great town had been smothered by asphyxiating gases and a quarter as many had been killed by high explosives. Three hundred tons of such terrible material had been dropped (theoretically) despite every effort to prevent it. General Groves officially announced that against such an attack no defense is possible except such as can be supplied by a superior air force.

THE DEFENSELESS BATTLESHIP

(Continued from page 422)

find it so easy. If I may be pardoned for inserting a personal experience, let me state my own experience with this weapon—for I am trying to arrive at a just estimate of the worth of the weapon on which the Navy mainly depends for protecting its battleships:

I spent ten months in France with a night-bombing squadron, flying the old F E 2 b, a sluggish crate capable of no more than 70 miles an hour. We carried two 112-lb. bombs, or one 300-lb. bomb, or 12 Hales bombs of about 20 lbs. each. With this load we would stagger across the lines, night after night, weather permitting, usually for the same targets. Of course, we were expected and were warmly welcomed soon after we crossed the lines. Up would come the searchlight beams, up would come the "onions" (incendiary small caliber shells) and up would come the high explosives, 4.5, 5.9, and so on. Now, I went out with that squadron, 102 Squadron, R.F.C., and a bold bunch of young lads we were. I don't think that any of us were afraid of anything—the first week. We just dashed over that country back of the German lines disporting ourselves with all the gay abandon of young rabbits gambolling about in the moonlight. We glided down to

(Continued on next page)



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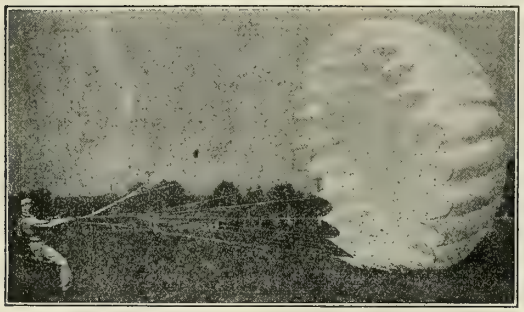
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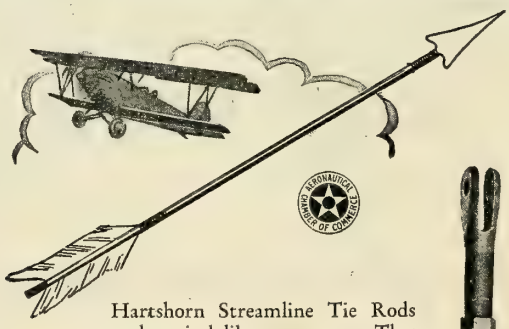
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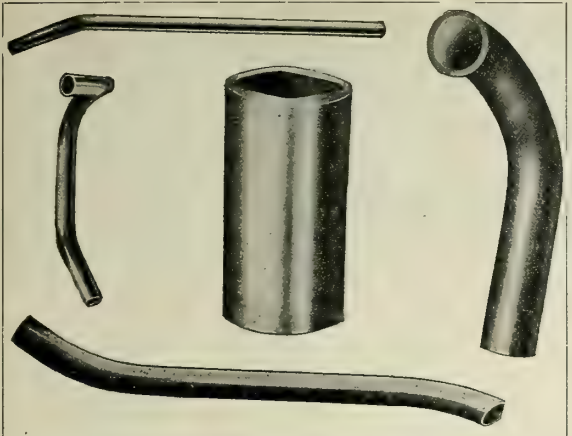
within a few hundred feet of our targets, dropped our bombs, and created general havoc, or so we supposed. But in that first week one of our planes failed to return, and several others came back with sundry holes shot in them. It gradually began to dawn upon us that we were not to have everything our own way—that the despised antiaircraft and the not-so-much despised machine guns from the ground were apt to be dangerous.

Now, during the first week or two most of us collected bullet holes and shrapnel holes in our planes. But in the weeks that followed hardly a plane ever had a mark on it. The inference is plain. We had learned caution and now were bombing from a higher altitude—from 2,500 feet up to 5,000 feet, which was about the limit with that type of plane, loaded. I may add that most of the holes in the planes were from machine-guns—very few from shell fragments. But we were driven upstairs where, with the old bomb-sights of those days, our bombing was far from accurate. To-day the sights are improved, the machines are enormously improved, and the bombing heights are increased. In that time the guns have improved only slightly. But the point I would make is that while we all professed to have a great contempt for antiaircraft, nevertheless we kept as far out of its way as possible. There were "hot spots" that none of us would go over unless ordered to bomb that particular spot. Also, the hits on our planes, the odd splinter through fabric, were few and far between in our squadron of 18 planes, going over the lines every possible flying night; and I believe honestly that we were justified in our avowed contempt of the antiaircraft gun as a weapon of precision. In fact, I know that we were. But at the same time, the business had a psychological effect upon us which was very wearing on the nerves. I know of none of us who begged to stay out in France fighting once we had been given orders to return to Home Establishment for a rest.

It may be argued that you cannot shoot a man down with psychology—that you have to hit him. Granted. But no one can tell me that I can drop bombs as accurately on a target that is firing back at me, as I can drop them on one that isn't firing; for I know that I cannot—unless I have grown much bolder with the years, which I rather doubt. So I hope that I have made it plain that I am not one of those who deliberately try to discount the power of antiaircraft, knowing nothing about it. I have a rather intimate knowledge of it from the painful end, and I am quite willing to admit that it is painful. But nevertheless, admitting all that, admitting that the bomber is driven higher by gunfire than he would fly if the battleship were unarmed, admitting that his bombing will not be so accurate, still I must say that antiaircraft fire never prevented me from flying to my target and from doing my best to drop my bombs upon it. Frequently I was nervous and frightened under fire—and I believe that 99 per cent of us were, if we will admit it—and the other 1 per cent were sub-normal—and for that reason I am willing to admit that my bombing was not as accurate and studied as it would have been had I been merely practicing on a target. But bear this fact in mind: *no antiaircraft gun prevented me from dropping my bombs on or near the spot where I had been ordered to drop them;* and no antiaircraft gun did me the slightest injury although I flew over them on every fine night for ten weary months. Our total losses were three machines out of 18 in over 200 raids, covering a period of ten months.

Now, the above was night-bombing, and the antiaircraft guns were firing from stable platforms on the ground. If under those conditions, with searchlights to aid them and with everything in their favor, they could shoot down only 3 planes out of 18 in 10 months (and we never learned which were shot down by A.A. and which by machine-guns) what are we to say of the accuracy of antiaircraft firing from such an unstable platform as the deck of a battleship wallowing through a heavy sea? In *Armaments and the Non-Combatant,* that excellent book by Mr. E. F. Spanner from which I have quoted before, this statement appears: "Further, no warship can rely upon aircraft delaying their attack until the sea is smooth. Will those who are familiar with the operation of antiaircraft batteries ashore permit themselves to imagine for a moment that their gun positions, instead of being flat and firm, are tilting to left and right, and backward and forward, the while

(Continued on next page)



SUGGESTING—

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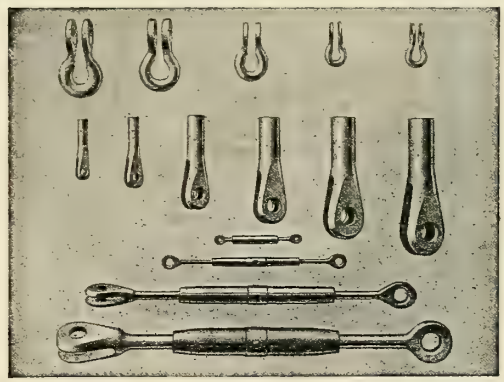
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(*Continued from preceding page*)

they are trying to get a sight on to their objective? Will those whose antiaircraft guns are mounted on trucks, imagine that the whole time they are in action their trucks are chasing up and down a series of irregular hummocks of slope varying from one in ten to one in four, passing over several such hummocks every minute, the truck pursuing a zigzag path from one side to the other across the crown of a well-cambered road at the same time? Those are the conditions which will have to be faced by naval gun-layers when trying to drive off aircraft attacks delivered by an enemy who understands his job. How the British Admiralty expect to fight with 4.7-inch A. A. guns in such circumstances passes understanding."

And how the *West Virginia* is going to handle her A. A. guns in rough-sea conditions passes my understanding. A deflection of only an inch when the gun is fired would be multiplied to a miss of hundreds of yards at an altitude. Yet how are the crew to handle the gun with the ship rolling and pitching in a heavy sea? Incidentally the heavy sea would mean nothing to the airplane. On a fine day after a storm the air might be wonderful for flying, clear sky and still air, while the surface of the sea would be a long heavy swell that would render all gunfire a matter of even more guesswork than it would be on a quiet day. Even a slight sea would seriously hamper the work of the guns.

In the last war and in the Spanish American war the percentage of hits recorded were surprisingly small. H. W. Wilson in *Battleships in Action*, says: "The total of hits made by German heavy guns was 120 or thereabouts, out of 3,597 heavy shells fired, which works out at *3.3 per cent of hits.* The total made by the British was 100 hits with 4,598 heavy shells, or about *2.2 per cent of hits.*" Surely this is not a very encouraging percentage. But what are we to say when we consider that this miserable score of 2.2 per cent was made in firing at targets lying on the water or proceeding at the very moderate rate of speed developed by battleships? And what are we to say of men who have to admit that their guns are good for no better score than that, and yet who pretend that they can hit airplanes flying four miles high in the air? Or two miles? Or *any* height?

When a battleship is firing at another battleship, it is firing at a target 600 feet long, broadside, or 97 feet wide, when the ship is bow or stern on. The other battleship may move away or to either side; it cannot go up or down. And its speed is easily computed by the attacker. It is a huge target, moving at a slow speed, on one plane. *Yet only 2.2 per cent of hits are recorded* by the British Navy at the Battle of Jutland. How in the world does the Navy expect to deal efficiently with small objects like airplanes, flying at unknown speeds at unknown heights? The problem is a hundred per cent more complicated—I might as well say a thousand per cent more complicated—than the problem of hitting another battleship lying on the sea. And in that problem the German Navy made only 3.3 per cent of hits, and the British Navy only 2.2 per cent. The American Navy's score in the Spanish American war was still lower.

In the various tests carried out by American battleships in firing at towed targets, the best of sea and visibility conditions were arranged for—if the day was unsuitable, the test was postponed. It is too much to expect that enemy aircraft will defer their attack until some day when the battleship faces the best sea and light conditions. Incidentally it might be remarked that the Navy is always eager to carry out tests wherein some poor benighted airplane goes up and tows a target on the end of a wire for the antiaircraft gun crews to fire at. They're at it constantly, until the thing seems to have become a mania with them. The Navy is concerned in one long anguished search for some certain means of putting the airplane out of business. And it cannot be put out of business by any such crude and inefficient method of warfare as that in which the Navy indulges. It can be put out only by other aircraft—and the Navy pays little attention to aircraft, except to regard them as an auxiliary to the battleship.

As the Navy itself places no reliance on the protective powers of the two or three spotting planes carried on the decks of battleships, we may also ignore them here. And rightly. For the protective power of two or three observation planes, designed and

(*Continued on next page*)



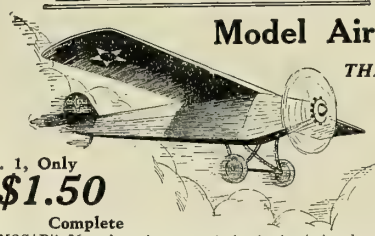
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built merely to go up and observe the effect of the ship's gunfire, may be placed at a very low figure. Certainly these few planes would be unable to defend the battleship from an attack by a squadron of bombers or torpedo carriers; and while they might put up a battle and account for some of the enemy, it cannot be advanced seriously that the few planes a battleship is able to carry could ward off the attack of a whole squadron of bombers, probably protected by another squadron of fighters, against which the observation planes would have less than no chance of survival. My only reason for mentioning them is to dispose of the thought that possibly the battleship will be protected by aircraft. They will not be protected by any that they carry themselves, for they cannot carry enough to put up any adequate defense against numbers working from shore bases or from carriers.

After all, why are navies generally so determined to keep the battleship as the backbone of the fleet? When all is said, the only excuse for its continued existence is that it may act as a floating gun platform from which shells may be hurled at enemy battleships. And why hurl a relatively ineffective shell when you can drop a wholly effective bomb or a torpedo that certainly is several hundred per cent more effective than the largest shell, because it may hit the unprotected under-water hull. A 15-inch armor piercing shell weighing a ton would carry only 5% of its weight in explosives, or 100 pounds. A bomb weighing one ton will carry from 1,000 to 1,500 pounds of its total weight in explosives. The cost of one shot of a 15-inch gun is about $2,500. The cost of a 2,000 pound bomb in production is only about $800. The destructive effect of the bomb as compared to the shell is about in the same proportion as their percentage of explosive, or ten times as great for the bomb.

General William Mitchell states: "The effect of a large bomb hitting the deck, even though it exploded against the armored deck, would probably be to kill or render unconscious or incapable of action most of the crew, from the detonation alone. When we hit the *West Virginia*" (that was the older ship of that name) "just forward of the after turret with a 1,100 pound bomb, a great portion of the deck was heaved forward, cutting down both masts, the whole waist of the ship, the bridge, the conning tower and everything before it. The ship sunk in 4½ minutes. If her magazines and boilers had been full, she would have blown up in addition. Any large bomb exploded in this way would put out of commission the electric signalling devices, search lights, steering mechanism, probably the speaking tubes, compressed air system, and the radio. As to blowing open a turret, if the bomb happened to hit directly under it and detonated against the protective deck, it would probably turn the turret upside down."

Despite their knowledge of what the bomb can do, the battleship enthusiasts still cling to the big gun, a relatively feeble weapon. Why? Is it because the old gentlemen who run the Navy prefer to keep their comfortable old battleships at any cost, rather than go up and flit about in airplanes? I think so. Also, I think that that is the real reason why they pretend to take such comfort from the defensive powers of the antiaircraft gun and try to pretend that from such an unstable platform as the deck of a battleship it can hurl shells at an airplane flying miles above it while the ship rolls and plunges through the sea. And they seem to take no note of the fact that an efficient air commander would make it his first duty to neutralize the effect of antiaircraft fire by proceeding to drop a number of bombs on the deck of the ship.

And I would ask any battleship enthusiast to inform me how accurate the gunfire will be when large bombs are dropping all around the gunners? To the inherent difficulties I have enumerated, add several bombs, assorted sizes, gas, and smoke clouds—and then tell the gunner to hit a tiny object flying at 15,000 feet. General Mitchell does not consider antiaircraft fire an appreciable factor, and I believe that he is right. Without doubt it is the world's most hopelessly inefficient weapon—and I subscribe to that opinion with full knowledge of the psychological effect of shell-fire on any man who is forced by war conditions to face it for long periods of time. After all, you can't scare a man to death, though you can worry him to a point where he is not as efficient as he would be if he were unworried. But the war proved that, nervous or not, the old bomber dropped his bombs just the same;

(*Continued on next page*)

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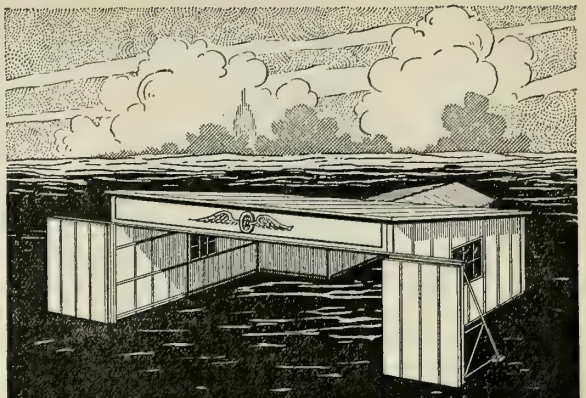
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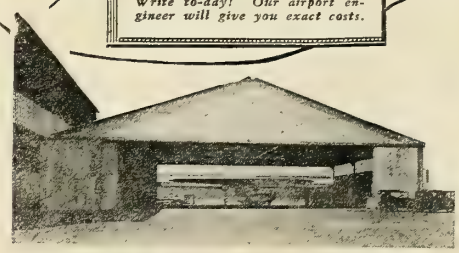
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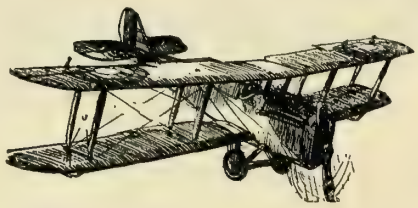


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(Continued from preceding page)

and he'll drop them just the same in the next war, with the difference that he now has efficient planes, efficient large bombs, and efficient instruments.

Ten years ago this summer I stepped out of the standard R. F. C. light bombardment night bomber. It carried about 300 pounds, unwillingly, had a ceiling of 5,000 feet fully loaded, and had a high speed of 70, with an especially good engine—the poor ones made 65 top. Only ten years ago! To-day the Army Air Corps is using the Keystone "Panther" known officially as the LB-6 type. It has a high speed of 120 miles an hour, carries fuel for 7 hours' flight at cruising speed, 100 miles an hour, is manned by a crew of five and carries a load of 2,150 pounds of bombs—two 1,100 pounders or one weighing a ton. The engines, two of them developing 525 h.p. each, are either Wright "Cyclones" or Pratt and Whitney "Hornets." Compare that with the old bomber of only ten years ago; compare it with the old Handley-Page, that carried a good load but flew slower than the *Los Angeles.* And wonder what improvements will be made in the next ten years. Also wonder what battleship enthusiasts *are really thinking* as they see these great airplanes, carrying a ton of bombs at a speed of two miles a minute.

General William Mitchell, from whose testimony before the Aircraft Board and from whose book I quoted extracts in former articles, makes this comment in a letter the other day: "I notice that you said nothing about these big old tubs anchored in a harbor. That is where they are really vulnerable. Our fleet has only had one or two maneuvers trying to get out of a harbor in formation. When they went out of harbor to the Hawaiian maneuvers a couple of years ago, two of them nearly sank each other in the middle of the Golden Gate. That is a pretty delicate operation to get these big lumbering tubs out in the open seas. I call to mind a statement that Admiral Von Scheer made about fleets anchoring in time of war, as follows: 'They can not steam from the beginning of a war until the end at full speed, zigzagging night and day, but must anchor to overhaul machinery and to replenish their ammunition and their fuel.' That would be a decisive time for aircraft to hop on them."

It would indeed. In an article in AERO DIGEST over a year ago I described the U. S. Fleet anchoring in the Hudson River. It took them all morning to come in, and at that the *Colorado* went aground and did damage to its hull of $250,000. Just imagine the fleet endeavoring to about-turn in the narrow Hudson and go out to sea while several fleets of enemy aircraft were dropping bombs upon them. This is not so hard to imagine in the next war. As Von Sheer states, battleships cannot keep the seas constantly. They must return to port for fuel and ammunition, and occasionally to be drydocked for repairs—as the *Colorado* had to be even without a war. And it is quite possible that some of these ships will put in to the Brooklyn Navy Yard. In which case an enemy has the right, by every law of civilized warfare, to bomb the ships in harbor, to bomb and to destroy the Navy Yards, without any provision that the one in Brooklyn will be held sacred. This thought leads me to suggest that the United States Navy instead of being a protection to the city of New York is, by reason of its Brooklyn Navy Yard, a distinct menace.

In conclusion I wish to state again the offer of the publisher of AERO DIGEST to open these columns to any competent naval authority who desires to take issue with me on this subject, and prove that I am wrong in my contention that the battleship as a weapon of national defense has been rendered obsolete by the development of aviation. And I state again that I pretend to no great knowledge of the matter, but have come to my conclusions mainly by a study of the works of naval writers themselves—most of them favorable to the battleship—and a study of the testimony given by American naval officers before the investigating committees. This is information that is open to anyone, even to tax-payers. If more of them would examine the matter of national defense, it is just within the bounds of possibility that the United States would own more airplanes and fewer battleships.

NOTE:—*British Cruiser "Dauntless," mentioned in August issue, was stated in press despatches to be a total loss. I am informed now that this ship has been salvaged.*

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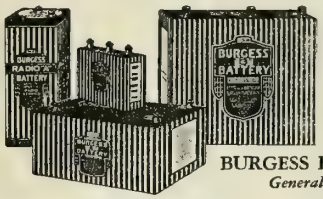
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INVERTED FLIGHT

(*Continued from page* 423)

inverted loop; outside loop; vertical figure "S", and other experimental maneuvers.

At the outset of this discussion it is desired to emphasize the value of information derived from the use of a small scale model in working out involved aerial evolutions. Prior to attempting any of the maneuvers the necessary control dispositions were studied by adjusting the cardboard control surfaces of a model. This enabled a clear, definite picture of what was to be done to be carried into the air, and prevented the writer from staggering into and out of embarrassing attitudes.

In order that a pilot may be able to devote all of his faculties to the business in hand it is of extreme importance that he be firmly secured to the airplane. After he has tested his safety belt and is satisfied that it is thoroughly capable of holding him in the plane his relief will have a marked effect upon his flight control. During his first effort to maintain inverted flight he will very probably depend upon his natural sense of flying, and this mastered, his interest will naturally turn to his instrument board for a more accurate check. When he has become accustomed to reading his air speed indicator and checking his oil pressure, tachometer, etc., he is then in a position to develop full command of inverted flight.

Two methods of attaining the inverted position were investigated; by a slow half roll and by a half loop. The writer has always found it more comfortable to use the half roll method. By comparing the snap half roll with the slow roll it was found that the slow half roll was greatly to be preferred. The slow half roll brought with it much greater precision, was much more graceful and did not necessitate the application of excessive counter control. The slow roll method involved the following control movements:

At an indicated air speed of approximately one hundred miles per hour right aileron was slowly applied and the stick was drawn *back* far enough to hold the nose on the horizon, and then when the elevator failed to hold the nose up left rudder was applied slowly and to such an extent as to accomplish that purpose. When the wings had assumed the vertical position, the rudder alone was holding up the nose. As the wings passed the vertical position the stick was forced slowly but firmly forward and to the right. When the inverted position had been attained the rudder was neutralized and slightly offset to check the momentum and the stick was brought to the center lines, and forward to the neutral position for inverted flight. Since a neutral trim in normal flight caused the airplane to be exceedingly nose heavy in inverted flight, the application of full forward stabilizer tended to bring about neutral trim in the latter position. It was also found that to make a full forward or nose heavy stabilizer adjustment prior to the attempt to reach the inverted positions resulted in robbing the translation of most of its smooth features.

The half loop method of attaining the inverted position, necessitated beginning the maneuver with an air speed considerably in excess of that required for a standard loop. Close to the top of the loop it was found desirable to make compensation for the tendency of the nose to fall away quickly and this was done by placing the stick well forward of the neutral position for inverted flight. Where compensation was delayed too long the nose of the plane would fall quickly and it was necessary to acquire considerable speed before forcing the nose up to the normal inverted gliding angle. It was found that the necessary stabilizer adjustment for inverted trim could be comfortably made prior to the inauguration of the loop.

It is quite simple to maintain lateral balance as soon as the pilot has familiarized himself with the new control reactions. To move the "stick" to the right in normal flight results in depressing the right wing. To move the "stick" to the right in inverted flight results in raising the right wing. To move the control stick forward in inverted flight results in raising the nose of the airplane and decreasing the air speed. To draw it back, aft or neutral, depresses the nose and increases the air speed.

It requires very little practice to become familiar with this control. In inverted flight the response to aileron movement is sluggish and tardy and necessitates considerably greater stick travel than in normal flight. The longitudinal control of the airplane used was found to be much more responsive than the aileron of lateral control and thoroughly satisfactory. The writer's early attempts at main-

(*Continued on next page*)



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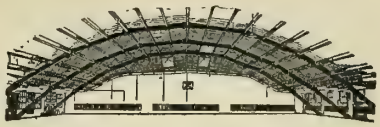
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(Continued from preceding page)

taining a safe flying speed were more a matter of studied thought than instinct. Air speed indicator readings taken on the airplane used for these tests showed in normal flight a minimum flying speed of about 57 miles per hour while in inverted flight the minimum comfortable speed was found to be approximately 82 miles per hour.

It is advisable for the pilot who is flying in the inverted position to remember that his ideas of right and left are contrary to the ground observer's conceptions of the same points. Should he be flying invertedly to the right of another airplane and intend to half roll to normal flight, he must use left rudder and right aileron in order that his airplane's transfer will be away from the other airplane. Should he intend to come closer to the other airplane, he must use right rudder and left aileron. The readjustment is quite simple to understand but it is necessary that this understanding be crystallized by extensive practice into instinctive capacity to execute.

It is suggested that the pilot who is flying in the inverted position should plan his right and left half rolls to normal flight from the standpoint of the observer who is in normal flight.

Assuming that he intends to roll to the right and away from another ship, it is necessary that left rudder be applied, that the control stick be moved slightly forward and to the right side of the cockpit. The application of his left rudder will turn his airplane to right, forward stick will keep the nose of the airplane "up" and right aileron will assist the right wing in its travel up and to the right. To execute such a recovery with "power off" will necessitate a loss of from 50 to 75 feet altitude. In executing the same maneuver with "power on" considerable altitude can be gained.

The reluctance to use right aileron with left rudder and vice versa is probably due to the habit developed during normal flight of using right aileron with right rudder and left aileron with left rudder. It is hard to overcome habit.

In comparison with the half roll method of regaining normal flight, the half loop method is decidedly crude and necessitates a loss in altitude of 300 or 400 feet, while working havoc with the pilot's vision and greatly affecting all of his physical reactions. The effect of flying for a considerable length of time in the inverted position is to increase the blood pressure in the pilot's head, and the quick change of pressure due to coming out in the half loop with its attendant vertical acceleration, materially affects vision. This form of recovery was attempted several times with the idea of aggravating the conditions. Estimating the time as closely as possible, it was found that from seven to nine seconds were required before sufficient vision was restored to continue the flight. During this period of insufficient vision the airplane was maintained on an even keel, engine idling, merely by sense of feel.

In inverted flight the responsiveness of the lateral control does not compare favorably with that of the longitudinal control. The lack of responsiveness increases as the flying speed is reduced, and as the inverted stall position is approached, considerable difficulty is experienced in maintaining lateral balance. In the fully stalled position one wing will drop and the airplane will fall away in an inverted side slip, showing no tendency to spin. Investigating this systematically, it is found that the responsiveness to elevator control softens gradually and in true conformity with the manner in which the control is handled. When the stall position is approached gradually, the nose will drop slowly and smoothly until the speed has been increased to the requisite point.

An attempt was made to determine the general attitude the airplane would assume when allowed to fall unguided from the inverted stalled position. During three of these experiments the airplane was permitted to fall approximately 2,000 feet and exhibited no tendency to assume any general direction or attitude. It was also noted that the airplane showed no tendency automatically to right itself or to resist an effort to bring it back to normal flight.

Allusion has already been made to the ease with which a pilot can become accustomed to the proper handling of his apparently crossed controls. This is true so long as straightaway flight is maintained. In such case the pilot will be chiefly concerned with the maintenance of lateral balance and the general disposition of the stick with regard to elevator position. In such flights, of course, the rudder may be practically ignored and held in a neutral position.

(In the next article of this series, Lieutenant Williams will deal with the "inverted turn.")

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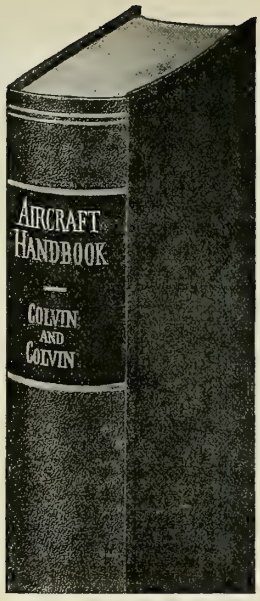
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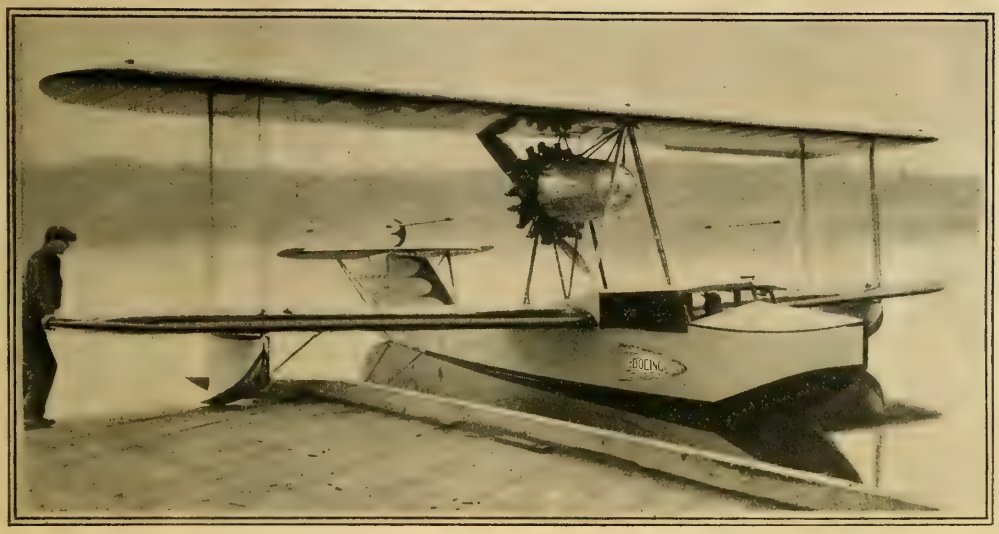
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Wings
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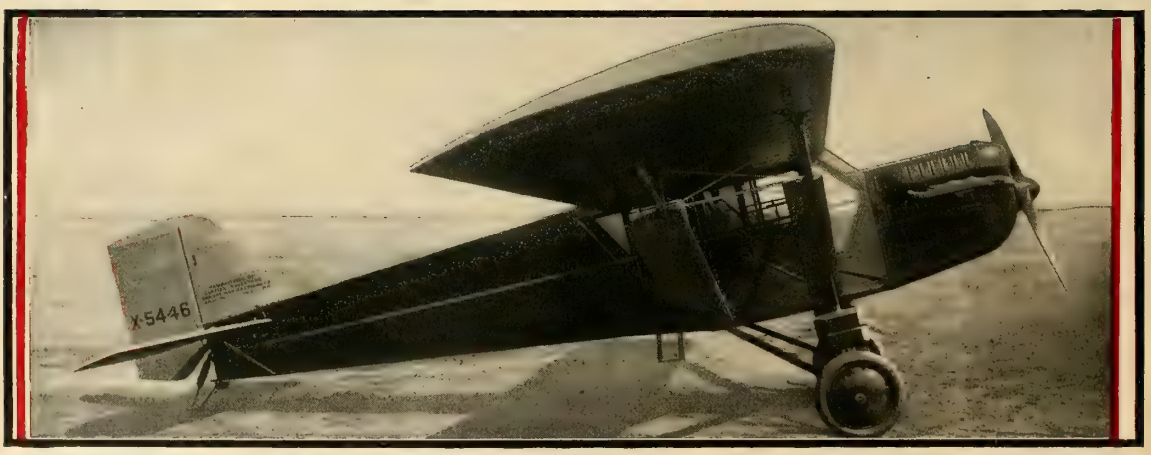
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ALUMINUM

Curtiss Robin



SPECIFICATIONS

Name	Curtiss-Robin
Type of Plane	Semi-Cantilever Monoplane
Design	Three Place Enclosed Cabin
Color	Burnt Orange and Yellow with Black Trimmings.
Wing Spread	41 feet
Length	25 feet 9 inches
Height (*over all*)	7 feet 9½ inches
Motor	Curtis OX-5-90 horsepower

Planes are designed to accommodate air-cooled motors when they reach a popular price level.

Gasoline Capacity	50 gals. (25 gals. in each wing)
Weight (*Empty with water*)	1489 lbs.
Weight (*Useful load*)	728 lbs.
Weight (*Gross Weight*)	2100 lbs.
Price at Factory	$4,000.00

PERFORMANCE WITH FULL LOAD

High Speed (*miles per hour*)	100
Landing Speed (*miles per hour*)	40
Cruising Speed (*at 1300 r. p. m.*) M. P. H.	85
Rate of Climb (*ft.-min*)	450
Endurance, Full Throttle (*hours*)	5.56
Endurance at 1300 r. p. m. (*hours*)	7.1
Miles per gallon of gas	12
Range, Full Throttle (*miles*)	556
Range at 1300 r. p. m. (*miles*)	604
Service Ceiling (*feet*)	12,000
Absolute Ceiling (*feet*)	15,000
Climb in 10 Minutes (*feet*)	4,100

Built for Safety

"It's next to impossible to make it spin unless you use brute force . . . It certainly is a smooth-riding ship . . . I've never piloted a plane that requires so little effort to keep it on a straight, true course." These are the enthusiastic judgments of pilots and aviation authorities after flying the Curtiss-Robin.

They all agree on the remarkable safety, stability and dependability of this plane. This is no mere coincidence. These three vital factors were built into the "Robin" by the same staff of engineers that made Curtiss military aircraft famous throughout the world.



The large fin and rudder area insure smooth, straight flying. Note the rugged construction of the detachable tail skid.

Many months and thousands of dollars were invested in testing and re-testing every feature of design and construction before final specifications were approved. No detail, however small, was overlooked. Everything was done to make it the finest and safest commercial airplane in the country.

The materials and equipment of the "Robin" were accepted as standard only after they were proved the best money could buy for the purpose. They had to meet the rigid Curtiss requirements. All parts test to more than Department of Commerce specifications.

This same accuracy and care is evident in every step of manufacture. Every operation is thoroughly checked, inspected and re-inspected . . . especially in the hidden, vital sections of this plane . . . to more than meet all demands for strength and safety.

Curtiss-Robertson thoroughness is apparent also in the selection of its dealer organization . . . the requirements of which are competence, responsibility and ability to provide complete satisfaction to Curtiss-Robin owners.

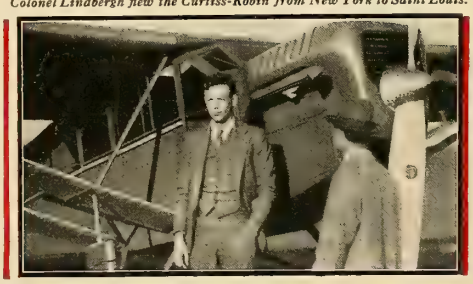


The Curtiss-Robin photographed during one of the numerous and accurately-checked test flights. Every "Robin" is test flown.

There are additional facts about the Curtiss-Robin that will interest you. May we send them? Write.

CURTISS - ROBERTSON AIRPLANE MFG. CO.,
Anglum, St. Louis County, Missouri.

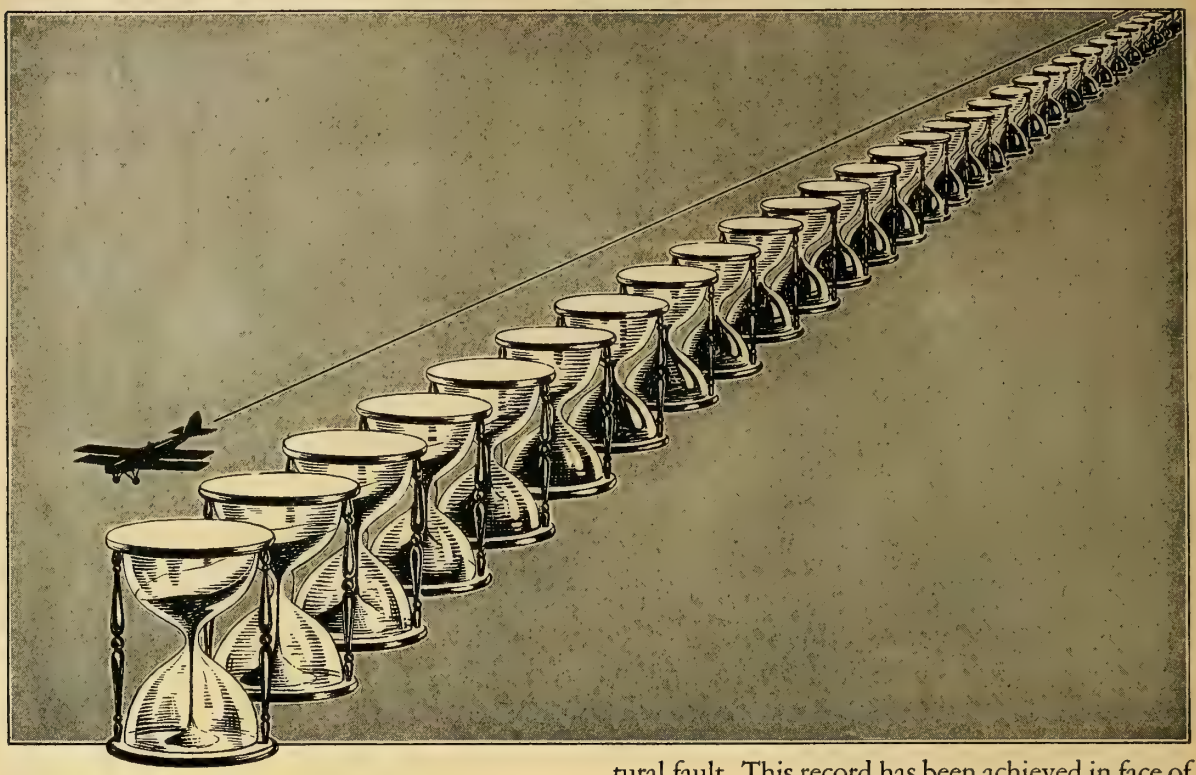
Colonel Lindbergh looped the "Robin" seven consecutive times during a test flight. The following day, with Major Robertson as passenger, Colonel Lindbergh flew the Curtiss-Robin from New York to Saint Louis.



DISTRIBUTORS

Air Transportation, Inc., *Minneapolis, Minn.* . . . H. M. Brown, *Salt Lake City, Utah* . . . Buffalo Flying Service, Inc., *Buffalo, N. Y.* . . . Cardinal Fliers, Inc., *Louisville, Ky.* . . . Curtiss Aeroplane Export Co., *Garden City, N. Y.* . . . Curtiss Flying Services, Inc., *New York, N. Y.* . . . Dungan Airways, Inc., *Cleveland, Ohio* . . . Richard Lutz, *Oshkosh, Wisc.* . . . Robertson Aircraft Corp., *Anglum, Mo.* . . . S. A. Sloan, *Colorado, Texas* . . . Southern Aircraft Corp., *Pine Bluff, Ark.* . . . Harry Sperl Aero Corp., *Los Angeles, Calif.* . . . Spokane Airways, Inc., *Spokane, Wash.* . . . Texas Air Transport, Inc., *Fort Worth, Texas.*

FIRST AROUND THE WORLD



Time Proves All Things!

THE hour glass of the universe . . . time . . . is the basic and final standard upon which is judged the worth of all things created by man.

The thousands of hours and millions of miles of dependable flight back of Douglas planes stand as indisputable evidence of the fact that Douglas aircraft have passed the test of time.

In the air mail service of the Western Air Express, Douglas planes have daily flown the route between Los Angeles and Salt Lake City amassing a total of more than one million miles without a single structural fault. This record has been achieved in face of the fact that this route, one of the most difficult in America, passes through blistering desert heat and biting mountain cold. On land and sea, in the service of the United States Army and Navy, Douglas planes have proved their worth by thousands of hours of dependable performance.

Such records for reliability can be but the result of sound engineering plus a rigid standard for production that admits nothing short of perfection. It is the perfect fusion of these elements that enable Douglas planes to meet and fully satisfy the crucial test imposed by time, and thus add additional weight to the fact . . . . Douglas Means Dependability!

THE
DOUGLAS
COMPANY
SANTA MONICA
CALIFORNIA

"How can I get into Aviation?"





Read this Answer from

A World Famous Trans-Atlantic Pilot

AVIATION is waiting for no one! Too many millions of capital are already invested—the demand for air service of *every* kind is increasing too fast. Aviation demands men who KNOW. Men who can DO. Men who can step into the real jobs and command the real salaries. Plane production today is *ten times* what it was a year ago. And a year from now it will be twenty times what it is today! Landing fields, municipal airports, plane and equipment factories, air mail and passenger lines, service and sales organizations—all are leaping ahead in the fastest, most amazing development that any industry has ever known. In such racing, feverish activity, *where* is there any room for a man who has nothing to offer? An empty pocketbook is no drawback—but Aviation has no place, no patience, no *time* for empty hands or empty heads! Aviation is taking off for the greatest non-stop flight in history—and the men who will go along and climb to the top are the men with a foundation of FACTS under them.

Walter Hinton

The man who is ready to help YOU get into Aviation is the man who has *four times* been one of the world's outstanding flyers. Walter Hinton was pilot of the famous NC-4, first plane to fly the Atlantic; he piloted the first plane from North to South America; he was first to fly to the headwaters of the Amazon; he was the hero of the runaway Navy balloon that was swept halfway to the North Pole. But in addition to being an explorer, pioneer and aviator, Hinton also has the rare ability to teach *others* the knowledge he has gained. During the War he was a crack flying instructor for the Navy. Today—with a course that experts agree is the most complete and practical ever produced—Hinton is training keen-sighted men for the Big-Pay jobs in aviation.

You Don't Have to Fly; 40 Different Jobs on the Ground PAY BIG too!

To succeed in aviation—make BIG MONEY—you need not necessarily be a pilot. There must be many thousands of pilots, certainly. But for every plane that flies, there's an immediate need for trained men in more than *forty* different important jobs on the ground. Construction, motor and instrument experts—airport managers, service foremen, salesmen—all make *real* money. Some of them even bigger pay than pilots earn. But every last one of them must have the FACTS. Today's problem—YOUR problem—is to LEARN aviation quickly. And right there is where Walter Hinton is achieving the biggest success of his career.

Choose Your Job

(Here are a few of the 40)

Designer and Engineer, Pilot, Engine and Plane Mechanic, Rigger, Wire Worker, Electrician, Welder, Instrument Maker, Wood and Metal Worker, Draughtsman, Plane and Motor Inspector, Airport Operator, Radio Expert, Assemblyman, Aerial Surveyor and Photographer, Aerial Transport Manager, Salesman.

Get Your Ground Work NOW, Right at Home—Hinton Is Ready to Train You

You can train at home in spare-time for the best paid jobs in the Industry. Hinton's proved course starts you at the beginning, trains you fast. You get *all* the facts about construction, rigging, motors, repairs, instruments, theory of flight, navigation, commercial aviation—facts that *every* man must have to intelligently and profitably fill ANY job in the Industry. With this Institute's training you'll have your foundation, your *start*, for real accomplishment. Serious-minded—*air-minded*—men are reading and *acting* on the Free Book shown below. YOU should have a copy, too! Send the coupon NOW.

Get his FREE Book

This FREE Book is YOUR first step to Success. Take this step—send for this book *—NOW!*





AVIATION INSTITUTE OF U. S. A.

WALTER HINTON, President

1115 Connecticut Ave. Washington, D. C.

Rush back to Washington *Quick!*

Walter Hinton, Pres. 102-K
Aviation Institute of U. S. A.
1115 Connecticut Ave., Washington, D. C.

Please send me at once, your FREE Book, "Rich Rewards in Aviation", showing how *I* can get into this tremendous field.

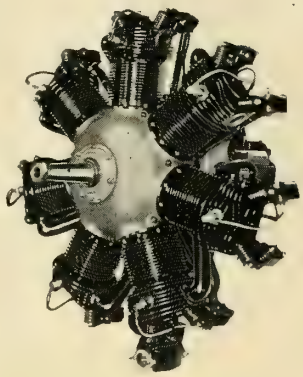
Name .....

Street ..... *Age* .....

City ..... *State* .....

A MAGNIFICENT VICTORY

WARNER SCARAB ENGINE



Wins

First - Second
Third - Fourth
place in class A
National Air Derby

This MATCHLESS MOTOR IS EQUIPPED with

RING TRUE BOHN BEARINGS

AND

BOHNALITE

Aircraft Castings

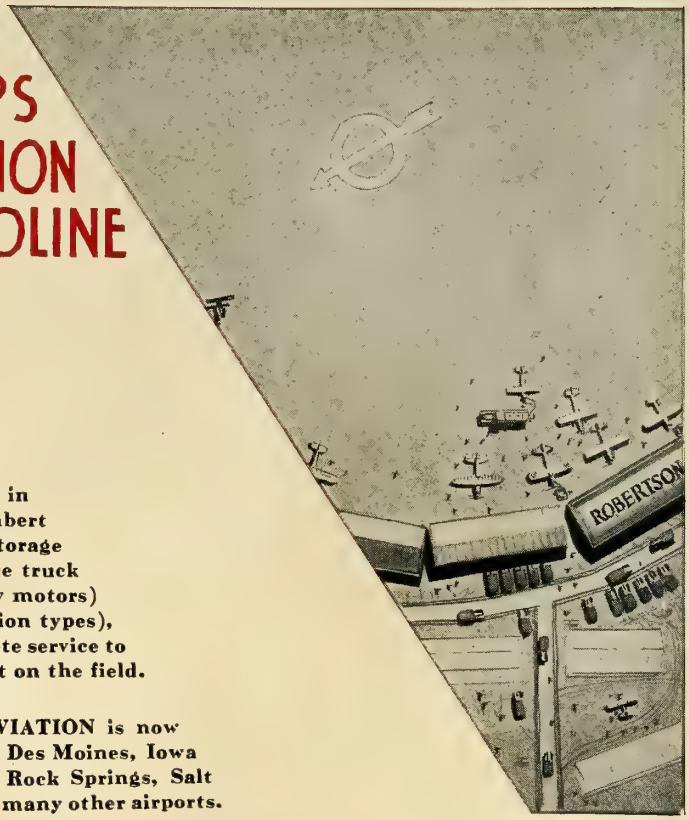
62% LIGHTER THAN IRON

AIRCRAFT DIVISION
BOHN ALUMINUM AND BRASS CORPORATION
DETROIT MICHIGAN

ROBERTSON

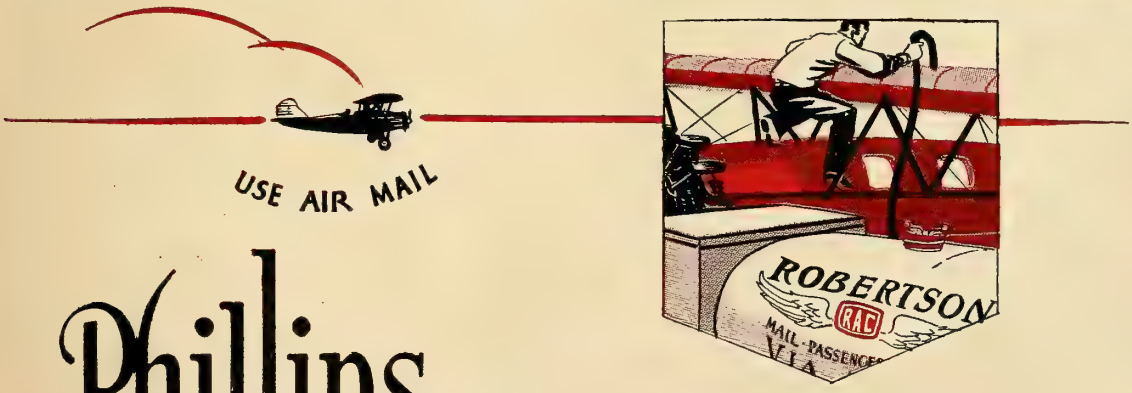
CHOOSES PHILLIPS AVIATION GASOLINE

The Robertson Aircraft Corporation of St. Louis, Mo., has grown to its present size and national reputation by doing things and by acting on its management's convictions. Consequently after months of experience with Phillips Aviation in its air mail planes, this company which carries the mail between Chicago and St. Louis and which holds the contract for the new air mail line from St. Louis to Kansas City to Omaha, decided to sell Phillips gasoline on Lambert Field at St. Louis.



Two service pumps have been installed in front of Robertson's new hangar at Lambert Field, supplied from two 12,000 gallon storage tanks. An especially equipped air service truck carrying PHILLIPS AVIATION (for the new motors) PHILLIPS 66 (for the older, low compression types), oils, grease, air and water, renders complete service to incoming and outgoing ships at any point on the field.

In addition to St. Louis, PHILLIPS AVIATION is now available at Chicago, Rockford, Clinton, Des Moines, Iowa City, Omaha, North Platte, Cheyenne, Rock Springs, Salt Lake, Wichita, Bartlesville, Amarillo and many other airports.

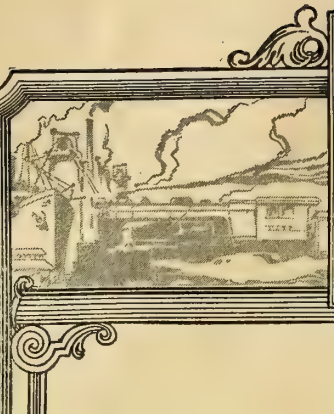


Phillips Petroleum Company

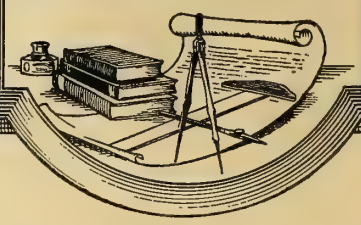
BARTLESVILLE, OKLAHOMA

NATURAL GASOLINE FOR CONTROLLED VOLATILITY

Phillips Aviation



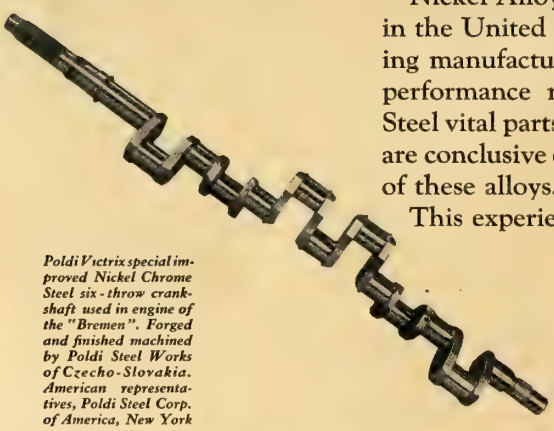
WHEN EXPERIENCE WRITES THE SPECIFICATIONS





The "BREMEN" Depended Upon a Nickel Alloy Steel Crankshaft in its Famous Trans-Atlantic Flight





Poldi Victrix special improved Nickel Chrome Steel six-throw crankshaft used in engine of the "Bremen". Forged and finished machined by Poldi Steel Works of Czecho-Slovakia. American representatives, Poldi Steel Corp. of America, New York

LIKE other aircraft that have established recent long distance flying records, the "Bremen", in its remarkable westward trans-Atlantic flight, relied on the dependability of Nickel Alloy Steel parts. The "Bremen's" crankshaft was made of special improved Poldi Victrix Nickel Chrome Steel.

Nickel Alloy Steels are widely used both in the United States and abroad by all leading manufacturers of aircraft engines. The performance records of the Nickel Alloy Steel vital parts used by these manufacturers are conclusive evidence of the dependability of these alloys.

This experience of typical users has contributed to an extensive fund of valuable technical information. You are invited to consult our engineers and thus draw upon these helpful data.

FOR STRENGTH WHERE THE STRESS COMES — NICKEL STEEL

Nickel FOR ALLOY STEEL

Send for "Buyers' Guide to Nickel Alloy Steel Products"

THE INTERNATIONAL NICKEL COMPANY (INC.), 67 WALL STREET, NEW YORK, N. Y.



· SUPREMACY ·

Spalding Aviation Equipment has been worn on practically every Trans-Atlantic, Trans-Pacific, and Polar flight. Today it is the choice of nearly every pilot of note.

A. G. Spalding & Bros.

© 1928, A. G. S. & B.



Over scorching desert or snow-capped peaks

-TP- Aero protects your motor

-TP- Aero, the Original Wax Free Oil is straight run refined from *100% pure paraffin base crude oil*, yet WAX FREE which is responsible for its LOW POUR. And as a fine paraffin base oil, it holds its viscosity despite high motor temperatures.

Fill up with -TP- Aero and you will immediately notice the increased r. p. m. Your oil pressure will increase and your guage will show this greater pressure is maintained. Your spark plugs will stay clean longer and give a hotter spark. And you will get more flying hours per gallon

Impose your own conditions, make your own tests. -TP- Aero will surprise you with its performance. It is an entirely new oil, made especially for aircraft motors. If your dealer cannot supply you, advise us.

Have you tried -TP- Aero Rocker Arm Lubricant —a pure paraffin base mineral oil lubricant?

TEXAS PACIFIC COAL & OIL CO.
Fort Worth, Texas

free—*Pilot's Log Book, 36 pages of blank forms with handsome durable cover. Free to you—send the coupon.*



AD-10

Texas Pacific Coal & Oil Co.
Fort Worth, Texas

Please send me, without obligation, your Pilot's Log Book, described above.

S.S.

Name .....

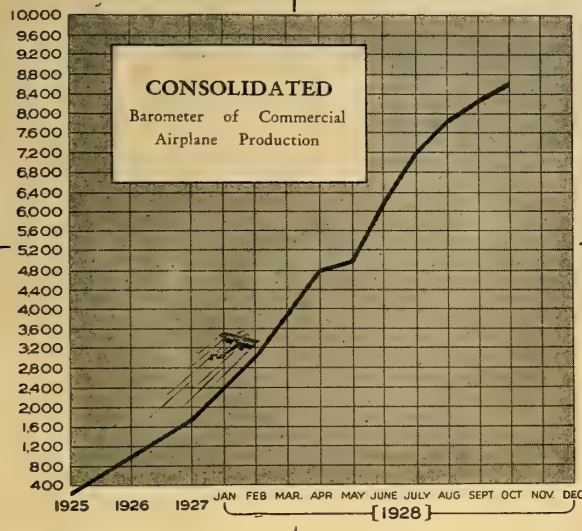
Address ..... State .....

City .....

Your Oil Dealer's Name .....

20 Leading Manufacturers Have Standardized on CONSOLIDATED Type A Instrument Panel

This chart indicates the constant growth of airplane production and the present approximate rate of manufacture (planes per 12-month period) indicated by the current delivery schedule of Consolidated Instruments.



During the steady increase of airplane production in the United States indicated in the accompanying chart, Consolidated Instruments, singly or in sets, have continued being included as standard equipment on 98% of all commercial aircraft.

This convincing testimony of the unvarying accuracy and durability of precision-built Consolidated Instruments is reiterated day after day by their performance on many thousands of planes under flying conditions of all degrees. That's why Consolidated has long been synonymous with reliability.

The twenty leading manufacturers listed to the left have standardized on Consolidated Type A Indirect Lighted Instrument Panel.

Manufacturers Using Consolidated Instrument Panel

Alexander Industries, Inc.
Arkansas Aircraft Corp.
Brunner-Winkle Aircraft Co.
Courier Monoplane Co.
Crown Motor Carriage Co.
Curtiss-Robertson Airplane Mfg. Co.
Federal Aircraft Corp.
Gates-Day Aircraft Corp.
International Aircraft Corp.
Kari-Keen Aircraft, Inc.
Mohawk Aircraft Corp.
Mono-Aircraft, Inc.
Nicholas-Beazley Airplane Co.
Paramount Aircraft Corp.
Stiles Aircraft Corp.
Taylor Bros. Aircraft Co.
Thunderbird Aircraft, Inc.
Travel Air Mfg. Co.
United States Aircraft Corp.
Vulcan Aircraft Co.

CONSOLIDATED

INSTRUMENT COMPANY OF AMERICA, INC.
41 East 42nd Street : New York

CONSOLIDATED INSTRUMENTS

Altimeters	Temperature Gauges	Inclinometers
Ammeters	Air Speed Indicators	Clocks
Tachometers	Instrument Panels	Navigation Lights
Oil Pressure Gauges	Gasoline Gauges	Landing Lights
Compasses	Air Pressure Gauges	Dash Lights
	Fuel Strainers	

98% OF ALL COMMERCIAL AIRCRAFTS ARE EQUIPPED WITH ONE OR MORE CONSOLIDATED INSTRUMENTS



Consolidated Instrument Panel A

This indirect lighted panel includes a Tachometer, Oil Pressure Gauge, Temperature Gauge, and Altimeter. The Panel meets all requirements as specified by the United States Department of Commerce.

No. 1083-B



AIRPLANE Mechanics and Engine Experts Needed!

WE have just promised to furnish a $2,000,000 aircraft factory, now building right on Parks Airport, with a minimum of 200 airplane and engine mechanics by February first! Do you want one of these jobs?

Whether you want to work in St. Louis, New York or Los Angeles, the first question your employer will ask is "*Where were you trained?*"

Because only *thoroughly trained* men are wanted, and these are paid *huge salaries!*

It costs *no more* to learn to build wings, fuselages, landing gears—to rig and service airplanes—to overhaul and install motors—in the largest civilian air school in America!

In fact, it costs less to be *thoroughly trained* than poorly trained.

In the Airplane and Engine Mechanics School of Parks Air College, we have Whirlwind, Caminez, OX5, Liberty, Hispano-Suiza, Velie and other latest motors. You tear these down, repair them, build them up and test them.

You learn all about airplanes and engines. You actually build airplanes complete piece by piece.

You learn factory production methods; become qualified for field duty, factory jobs, foreman's and superintendent's positions!

You get field duty on the flying line where you are entrusted with the responsibility of keeping a certain number of airplanes in the air. The Parks job-way system gives you training under *actual factory and transport conditions!*

Special Price

There are over 130 airplane factories and over 1,500 registered airports in the United States. New dealers, distributors, factories, airports are opening up *daily!* Where are all the mechanics coming from? To supply them we are offering a special rate *now* that saves you nearly half.

Get all the details. Send for a free copy of "The Man Who Tunes the Plane", our Mechanics School catalog, that gives you full particulars of the course, shows photos of students learning to build and service airplanes and engines, and gives you full details of how you can save $105 on the price of this great Airplane and Engine Mechanics Course.



Don't let this opportunity slip by! Wire at once for this free catalog or send the coupon by airmail today! This offer may never be repeated!



All photos taken on Parks Airport

PARKS AIR COLLEGE
AFFILIATED WITH PARKS-AIRLINES-INC.

MOST ELABORATELY EQUIPPED AIR SCHOOL IN AMERICA.

226-G MO. THEATRE BLDG. ST. LOUIS, MO.

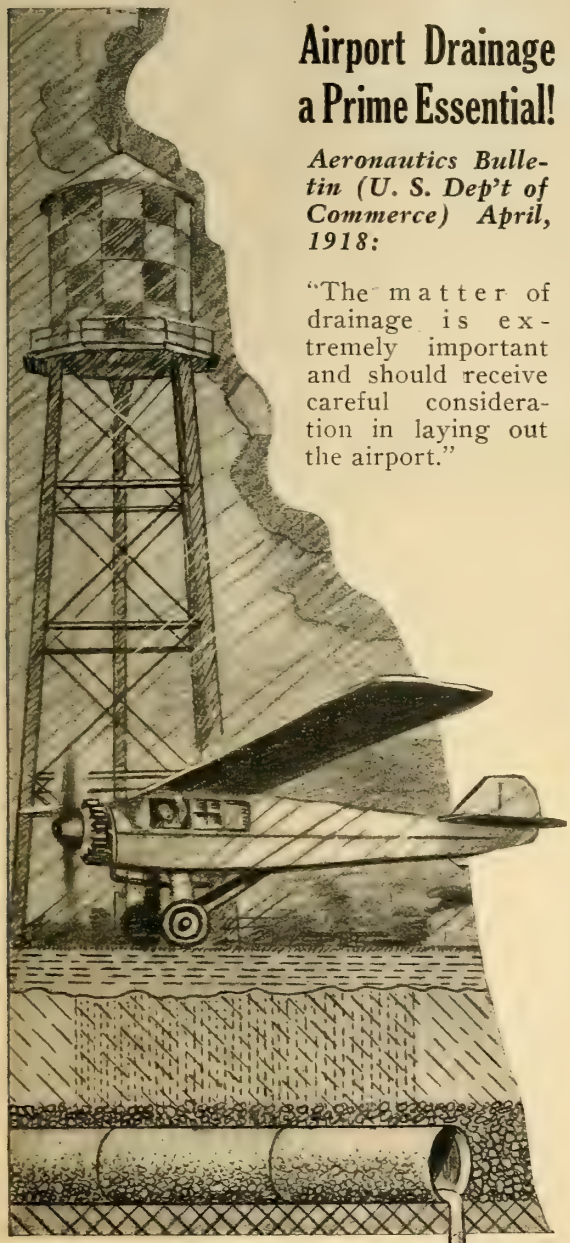
PARKS AIR COLLEGE, Inc.,
226-G Mo. Theatre Bldg., St. Louis, Mo.

☐ I enclose $25 deposit on the $195 rate for the regular $300 Advanced Ground Course.

☐ Send me "The Man Who Tunes the Plane".

Name . . . . . .

Address . . . . . .



Airport Drainage a Prime Essential!

Aeronautics Bulletin (U. S. Dep't of Commerce) April, 1918:

"The matter of drainage is extremely important and should receive careful consideration in laying out the airport."

Ten Times Faster Drainage at:

Teterboro Airport
Hasbrouck Heights, N. J.

Brainard Field
Hartford, Conn.

Tucker Field
Danbury, Conn.

Because "Poroswall" Recently Installed!

"POROSWALL" has ten times the drainage capacity of other drain pipes because, as its name implies, its walls are porous. It is laid with tight joints and its interior does not become clogged. It cannot get out of alignment and it is far stronger.

Says Clarence M. Knox,

Commissioner of Aviation, State of Connecticut:

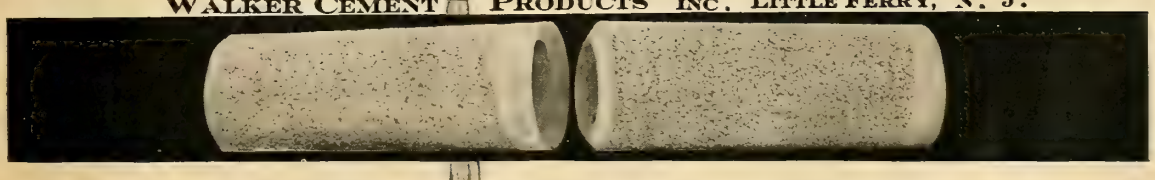
"Having visited the airport development in the City of Danbury, at Tucker Field, and observed the drainage system installed, I certainly want to congratulate you upon the new style of drain pipe used. In my opinion, this is the best thing of its kind that has ever been developed. There are several sections of Brainard Field that I hope to drain by means of Walker 'Poroswall' Rapid Drain Pipe". *(Note: This latter installation has since been made at Brainard Field).*

Descriptive Literature and Specimen Pipe Sent on Request.

WALKER POROSWALL RAPID DRAIN PIPE

Services of One of Our Drainage Engineers Without Cost

WALKER CEMENT PRODUCTS INC. LITTLE FERRY, N. J.



Did You See Our Advertisement in the September Aero Digest?

in the transcontinental of the 40 who finished -



1st place class A

THE AMBASSADOR
Los Angeles

September 15, 1928

Mr. I. H. Shearer,
Kendall Refining Co.
Bradford, Pa.

Dear Sir:

It certainly is a pleasure to be able to advise you that Kendall Penzbest Motor Oil gave me perfect satisfaction and played a mighty big part in helping me win first place in Class "A" of the 1928 Transcontinental Air Race.

It was particularly gratifying to note that the pressure of 90 pounds was constantly maintained at 2000 R.P M and crank case temperature at no time exceeded 155 degrees.

I feel that your oil is adapted to meet all conditions and am very glad to give this testimony to its exceptionally high quality.

Yours very truly,

Earl Rowland

THE AMBASSADOR
Los Angeles

September 15, 1928

Mr. I. H. Shearer
Kendall Refining Company
Bradford, Pa.

Dear Mr. Shearer:

After completing the Transcontinental Race in Class C and winning first place I want to express myself regarding your Kendall Penzbest J oil which I used in our Wasp motored Lockheed.

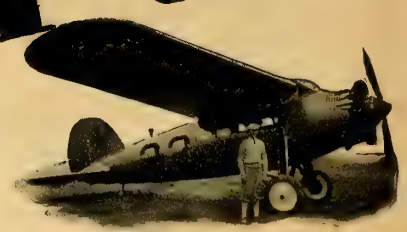
While we changed oil twice in the entire run, after draining it was very evident that no change was necessary as the condition of the Kendall J was excellent after 12 to 15 hours of use, also I find the low cold test of Kendall J is a great source of satisfaction in quick and easy starting and provides positive and free circulation without the usual drawn out warming up process required with other oils

On our arrival here our motor was inspected by factory representatives and found to be in perfect condition. Therefore I'm sure you will have a regular user of your products in us from here on.

With best regards.

R. W. "Bob" Cauhorn

1st place class C



KENDALL MOTOR

air race 1928
25 used Kendall Penzbest

Results that prove the Greatness of Kendall Penzbest Oil

THE majority of ships that finished the Transcontinental Air Race of 1928, including two of the three winners, used Kendall Penzbest Oil exclusively throughout the race. That, in a nutshell, is the Lubrication Story of the great Air Derby.

In class A, 22 of the 37 that started and 15 of the 23 that finished, used Kendall Penzbest Oil. In class B, 11 of the 20 that started and 9 of the 14 that finished, used Kendall Penzbest Oil. In class C, 1 of the 4 that started and 1 (the winner) of the 3 that finished used Kendall Penzbest Oil. In all, thirty-four (55%) of the sixty-one ships left Roosevelt Field with Kendall Penzbest Oil, while twenty-five (62%) of the forty ships that reached Mines Field, completing the Transcontinental Air Race, used Kendall Penzbest Oil throughout the trip. Thus did the results favor Kendall Penzbest users.

Pilots are fast learning that Kendall Penzbest—the Oil that is derived entirely from Bradford grade of Pennsylvania crude, the world's finest grade—is beyond question the finest, purest, safest and ablest lubricating oil for use in airplane engines of every type. Read the letters from Earl Rowland, winner of class A, and Bob Cantwell, winner of class C, on the opposite page.

If you would like to know the facts about Kendall Penzbest Oil, let us send you a copy of "Ground Flying on the Subject of Lubrication." Address Aviation Division, Kendall Refining Company, Bradford, Pa.

KENDALL PENZBEST MOTOR OILS

LUBRICATION ROLL CALL
TRANSCONTINENTAL AIR RACE 1928

Class A

Place	Pilot	Type of Plane	Motor	Lubrication
1	Earl Rowland	Cessna	Warner	Kendall Penzbest
2	Robt. Dake and Theo. Taney	American Moth	Warner	Kendall Penzbest
3	W. H. Emery, Jr.	Travel Air	Warner	Kendall Penzbest
4	Theo. W. Kenyon	Challenger	Warner	Kendall Penzbest
5	Tex Rankin	Waco	Curtiss OX5	
6	James S. Charles	Eaglerock	Curtiss OX5	Kendall Penzbest
7	Eugene J. Detmer	Travel Air	Curtiss OX5	Kendall Penzbest
8	Louis E. Derryberry	Travel Air	Curtiss OX5	Kendall Penzbest
9	Warren B. Smith	Swallow	Curtiss OX5	
10	Geo. Zinn, Jr. and George Hand	Challenger	Curtiss OX5	
11	Geo. W. Hopkins	Stinson SM-2	Warner "Scarab"	Kendall Penzbest
12	S. J. Wittman	Pheasant	Curtiss OX5	
13	Arthur W. Killips	Waco 10	Curtiss OX5	Kendall Penzbest
14	Stuart Chadwick	Waco 10	Curtiss OX5	
15	Samuel H. Turner	Berliner Mono.	Curtiss OX5	Kendall Penzbest
16	Alfred H. Stanley and Ralph Haynes	Waco 10	Curtiss OX5	Kendall Penzbest
17	A. H. Kreider	Challenger	Curtiss OX5	Kendall Penzbest
18	John E. Carberry	Moth	Cirrus	
19	M. E. Grevemberg	Lincoln-Page	Curtiss OX5	
20	A. K. Owen	Pitcairn PA-4	Curtiss OX5	Kendall Penzbest
21	Sidney A. Riley, Jr.	Travel Air 2000	Curtiss OX5	Kendall Penzbest
22	Don S. Phillips	Challenger	Curtiss OX5	Kendall Penzbest
23	George W. Brill	Travel Air	Curtiss OX5	

Class B

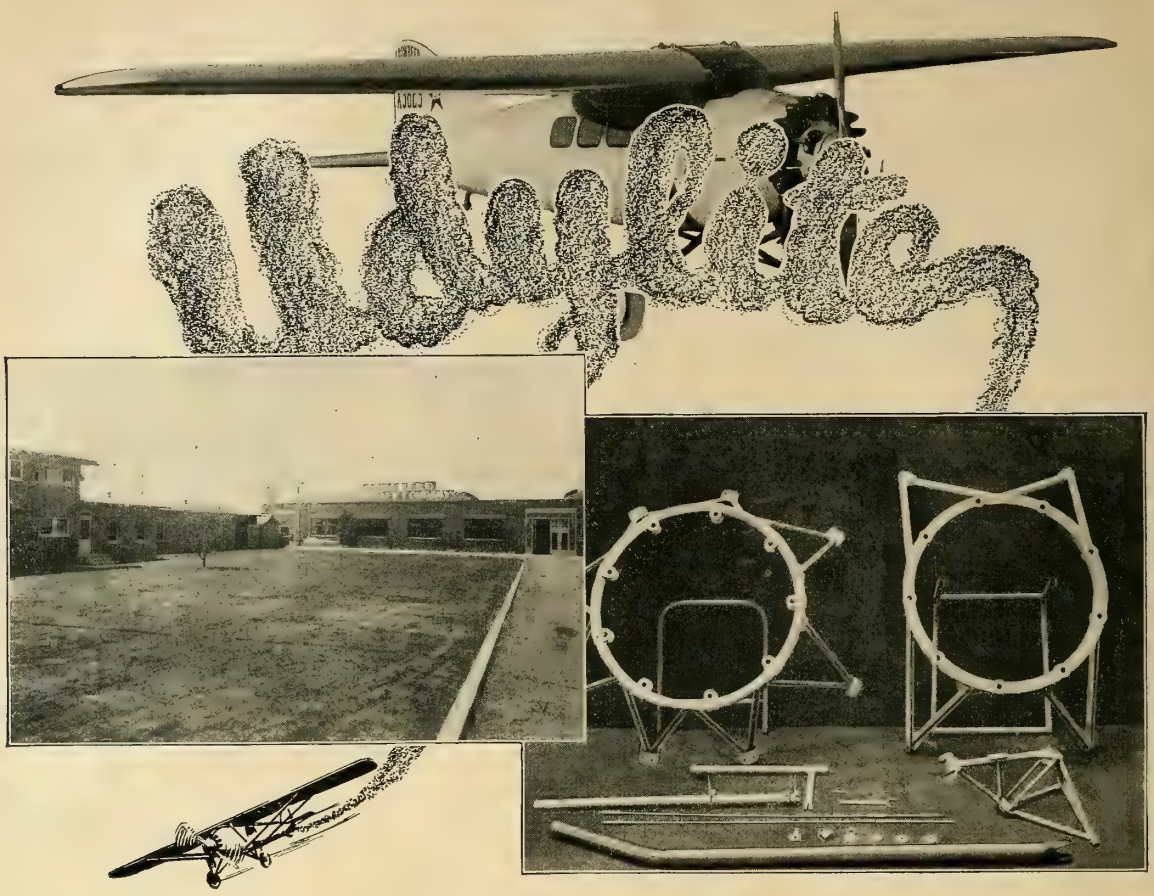
1	John Livingston	Waco 10	Whirlwind	
2	E. E. Ballough	Laird LC-R	Whirlwind	
3	John P. Wood	Waco 10	Whirlwind	Kendall Penzbest
4	Edw. G. Shultz	Cessna	Whirlwind	
5	Chas. W. Meyers	Waco 10	Whirlwind	Kendall Penzbest
6	L. F. Schoenhair	Buhl Airsedan	Whirlwind	Kendall Penzbest
7	T. A. Wells	Travel Air	Whirlwind	Kendall Penzbest
8	Jay Sadowsky	Cessna B	Whirlwind	
9	Ive McKinney	Pacer	Whirlwind	Kendall Penzbest
10	Maurice Marrs	Travel Air	Whirlwind	Kendall Penzbest
11	B. H. Shaw	Lockheed Vega	Whirlwind	
12	Raymond J. Merritt	Ryan B-1	Whirlwind	Kendall Penzbest
13	Mathew W. Whittall	Fairchild	Whirlwind	Kendall Penzbest
14	G. C. Quick	Cessna A	Anzani	Kendall Penzbest

Class C

1	Robert W. Cantwell	Lockheed Vega	Wasp	Kendall Penzbest
2	Capt. C. B. D. Collyer	Fairchild	Wasp	
3	Edw. J. Brooks	Fokker Spec. Univ.	Wasp	

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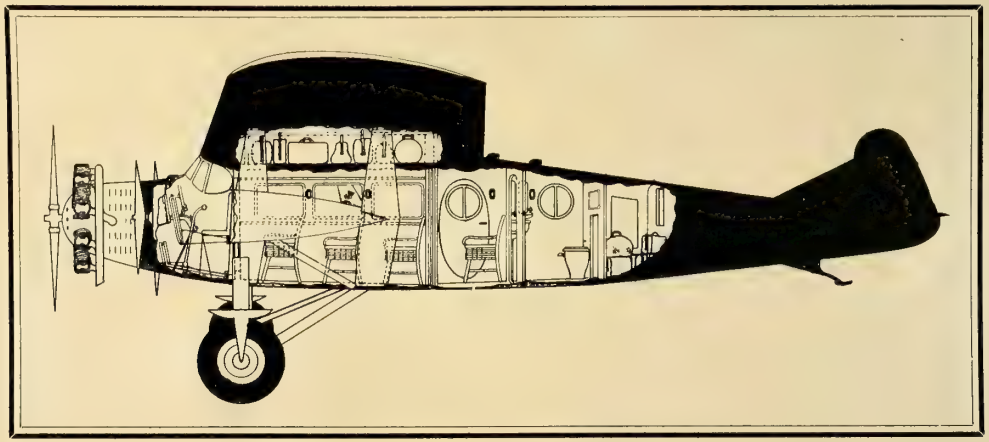
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BACH AIRCRAFT COMPANY

SANTA MONICA CALIFORNIA

Say you saw it in AERO DIGEST



The Ford plane at work

PROBABLY aviation will never lose its romance and glamor. We hope it won't. But these make little impression on bankers and investors, or for that matter, on your grocer, baker and gas company. Work, earnings, economies, profits—these are the prosaic but essential sustenance which permit commercial aviation to live, to expand, and to progress.

The Ford all-metal, trimotored transport monoplane is a working airplane, designed to stay on the job day in and day out, regardless of weather or other unfavorable flying conditions, and to earn its way for its owner while doing its job. Hence three engines. Likewise its all-metal construction which retards depreciation to such a degree that Ford planes on regular service for more than three years show no perceptible wear.

Many kinds of work are assigned the Ford plane. It speeds officials of large corporations from point to point. It soars over the Grand Canyon with tourists. It goes on charter trips half way across the continent and return. It discloses to visitors the shimmering beauty of the modern American city in sightseeing trips. It runs on schedules with clock-like regularity from terminal to terminal. It rushes with aid to inaccessible points in times of emergency.

It has faced the shrewish blasts of the Arctic, the sulky heat of the tropics, the desert dryness of the Southwest, the humid murk of the eastern seaboard. Winter and summer, fall and spring, are all alike its working seasons.

And under all of these conditions, the Ford plane earns its way.

We are giving here a partial list of owners of Ford planes, that you may see what varied work this versatile ship is performing:

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STANDARD OIL CO. OF INDIANA
THE TEXAS CO.
REMINGTON-RAND, Inc.
RAPID AIR LINES, Inc.
ROBERTSON AIRCRAFT CORP.
STOUT AIR SERVICES, Inc.
SCENIC AIRWAYS, Inc.
STANDARD OIL COMPANY OF CALIFORNIA
SKYVIEW LINES, Inc.
BRITISH COLUMBIA AIRWAYS, Ltd.
GREY GOOSE LINES
QUEEN CITY AIR LINE
NATIONAL AIR TRANSPORT, Inc.
JEFFERSON AIRWAYS, Inc.
AIR CRUISES, Inc.
U. S. ARMY
U. S. NAVY

THE STOUT METAL AIRPLANE CO.
Division of
FORD MOTOR CO.
Dearborn, Michigan

Volume 13
No. 4

AERO DIGEST

OCTOBER
1928

THE MAGAZINE OF THE AIR

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Haldeman, Spence and Davis photos.

1928 National Air Races, Los Angeles, California

At the top is shown the Three Musketeers, Colonel Lindbergh leading. Centre view shows the Exposition Hall and grand stand during the races. Bottom view shows some of the Transcontinental race planes at New York waiting to start

A DEPARTMENT OF NATIONAL DEFENSE WE NEED IT

By Hon. W. Frank James, M. C.

Ranking Member, Military Affairs Committee

THE advent of aviation as a weapon for the National Defense more than any other single fact brought strongly to the front the question — "Should the present War and Navy Departments be combined into a single department of National Defense?"

This question is one of such vital interest to the life and security of our country that it should be answered only after a careful consideration of all phases of the problem of National Defense. In order to afford the opportunity for such consideration, as well as to come to definite conclusions, I propose to introduce a Bill in the forthcoming session of Congress which will provide for a Department of National Defense and to urge whatever hearings may be necessary before the Committee on Military Affairs.



To insure National Defense is one of the main functions, if not the primary function of the Federal Government. It is accomplished by sanely and adequately preparing for war in time of peace, so that war, when and if it comes, can be conducted successfully and peace restored speedily with a minimum loss of life and expenditure of money.

The Constitution makes the President of the United States the Commander-in-Chief of our armed forces. As such, he has a very direct and immediate responsibility both for preparing for war and for conducting war. However, this responsibility he can meet only insofar as the people, through Congress, provide the means. These means consist of the laws enacted by Congress defining our Military Policy (and in using the term "Military" I include all the armed forces); the organizations authorized by Congress to be maintained in time of peace and used in time of war and last, but by no means least, the money which is necessary to carry on all these activities.

The problem confronting us here is one of organization. What is the best organization that Congress can give to the President in order that he may, most effectively and economically, prepare for and conduct war? That is the real question and it is one which affects the life and the property of every citizen. The people are entitled to have this question answered correctly from the standpoint of the citizen who pays the taxes and the man who is going forth to battle.

I realize that, in dealing with this problem, Congress must keep constantly in mind that the Constitution itself places the power to command the armed forces in the hands of the President, that in Congress we must deal with the means by which the function of command is to be exercised rather than with the exercise of command itself. The experiences of the Allies in the World War, as well as our own experience in the Civil War, fully demonstrated the soundness of the age-old principle of unity of command. Marshal Foch and General Grant were not only given the power to command the combined forces but they were also given the means to exercise this power. Our President has by constitutional mandate the power to command our armed forces. Is he now provided with the best possible means of exercising this power?

A brief reference to the means which are now provided and to some examples which have fallen under my own observation affords food for thought and reflection.

Under the present organization the President commands the Army and Navy through two civilian secretaries with a General Staff and an Operations Staff functioning under each secretary. These two civilian secretaries are independent of each other except that they are both members of the President's Cabinet. Where the interests of both Services are concerned the matter is referred to a Joint Board, consisting of senior officers of the Army and Navy. This Board studies the problem and submits its recommendations to the two secretaries for their approval. In addition to the Joint Army and Navy Board there are several joint boards or committees, one of which is the Joint Aeronautical Board. All of these Boards are composed of Army and Navy officers in equal numbers and from what I have learned about them they might in my opinion just as well be composed of a single member from each service, for I understand the members of each service act as a unit when it comes to voting.

That these boards do not settle all questions is beyond controversy. My personal opinion is that there has not been a single important question settled by this means.

In Hawaii, I found both the Army and Navy occupying Ford Island, an island that is not large enough for either but which neither of them is willing to relinquish. Upon my own responsibility as a member of the Military Affairs Committee I investigated this matter last year when I was in Hawaii. Because I am a member of the Military Committee I was studying the problem particularly from the standpoint of the Army, but as a member of Congress interested in the whole question of National Defense I came to the conclusion that the Army should get off Ford Island and go to a site on the mainland. A far better site could be secured near Ft. Kamehameha, and I introduced a bill to procure this site. This bill was approved by the President, by the Director of the Budget, was unanimously reported by the Committee

(Continued on page 855)

THE LONDON TEST RAIDS

By
James Warner Bellah
Special Foreign Correspondent to Aero Digest

WE are recovering slowly from the effects of the test air raids carried out on the Metropolitan area early in August, during which I found myself obliterated regularly three times every night between the hours of 6 p. m. and 9 a. m., and the strain has been frightful. Everyone in a position to do so has ridden the results for the publicity involved, and the talk threatens to go on until Christmas. It has a far more important place in the press than Mr. Kellogg's peace pact or even the Anglo-French Naval Treaty, which seems to be cramping Mr. Kellogg's style somewhat since America began to inquire about it.



Inasmuch as the results have been broadcast for all the world to know and such names as Lord Halsbury and Squadron Leader the Rt. Hon. F. E. Guest, M.P., late Secretary of State for Air, appear in print under headlines such as "England is in Deadly Peril" and "Our Lost Lead in the Air" it is a wonder that John Citizen hasn't the wind up higher than a kite.

All due respect to the men who have shouted and are shouting—a country can always do with its Kitcheners and its Roosevelts for, unlike the pacifists, they are always eventually right—but a little sane consideration is in order.

I saw perhaps fifty of the test raids myself and I have religiously culled every official report on the results.

From the technical standpoint the raids were a huge success. The point in having them at all has been missed. They were primarily a check up on the Royal Air Force program of expansion. They have, according to reports, brought out the fact that concentration is needed on the development of faster fighting planes, for the Fairey "Fox" day bomber, used as the enemy, was able to outstrip all the existing scouts with the exception of the Siskin 3A (Jaguar supercharged motor).

Unlike the silence which shrouded everything of a military nature ten to fourteen years ago, figures have been given out, I think, unwisely.

The "Fox" performance figures are interesting. With full military load (bombs, gasoline, M. G. ammunition, guns, pilot and gunner) she climbs to 10,000 feet in 11 minutes 15 seconds. Her speed is as follows:

6,500 feet—153.5 m.p.h.;
10,000 feet—150 m.p.h.;
15,000 feet—140 m.p.h.

Relative maximum speeds of fighters and bombers in present use bring out an interesting point. Consider them for a moment—

Bombers	m.p.h.
Fairey "Fox"	153.5
Fairey III F	126
Horsley	126
Virginia	116
Hyderabad	114
DH, 9 A	Also ran

Fighters	
Siskin 3A	above 153.5
Gamecock	152
Woodcock	135
Siskin 3	134

and you will see that one scout has the speed edge on all the bombers while the other two scouts have the edge on all bombers but one, the "Fox". In other words, the "war" was fairly well balanced as to equipment. Perhaps not as well as it will be next year but well enough for our purpose. What then do the tests prove from a non-technical standpoint?

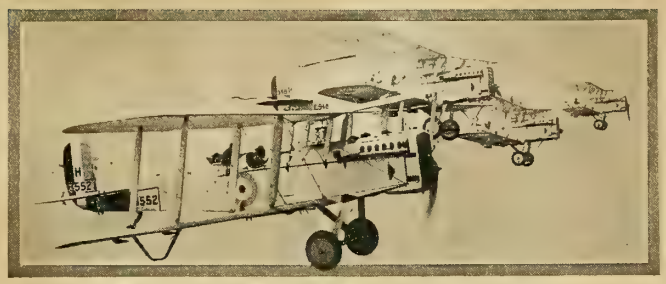
I'm afraid they prove something quite ghastly. I'm afraid they prove that no matter how hard you try to stop raiding squadrons, an average of three raids to fifty will slip through, owing to cleverness, luck, exigencies of the weather and the will of God.

During the late lamented war (four and a half years), 93 air raids were launched against England, 63 of which caused casualties, to wit: 1,245 killed (13 of whom were soldiers), 3,199 wounded (15 of whom were soldiers). High explosive, shrapnel, debris and incendiary charges were the cause. If you will compare the effective area enclosed by the outer splinter circumference of a 500-pound demolition bomb to the effective area of a lethal bomb (gaseous expansion of 1 to 1,000,000,000 is being spoken of over here), you will be able to multiply the casualties by the difference and get a rough idea of how civilian populations will suffer in the next war.



London as seen from the air

That's why the raids are being talked of. England and Continental Europe are flying with fear in the after cockpit. No country dares let any other take the lead for long. It is a situation that, owing to our isolation, does not confront us and it is one of the reasons that we have been backward in commercial flying. Commercial flying in Europe is simply another way of saying military flying. The Deutsch Luft Hansa representative at Croydon said to me offhandedly the other day: "This is a Vickers Vanguard, a troop carrier, you know. It's being used for passengers at present." Germany, by the Locarno Treaty, can have no military air force. Is it significant, then, that she leads the world in civil aviation? I don't think so. It's merely logical. Is it significant that European commercial airlines are heavily subsidized and that the English Press is agitated because the subsidy for like purposes in England has dropped to 220,000 pounds per annum?



A formation of DH 9s in Royal Air Force display.

The Earl of Halsbury says of the Locarno Treaty, incidentally, that it "made Germany the premier air power of the world", and it has in a way, for Germany flies more than any other country as the following schedule will show:

Germany flies 6¾ million miles a year; United States, 5 million miles; France, 3½ million miles; and England, 1 million miles a year.

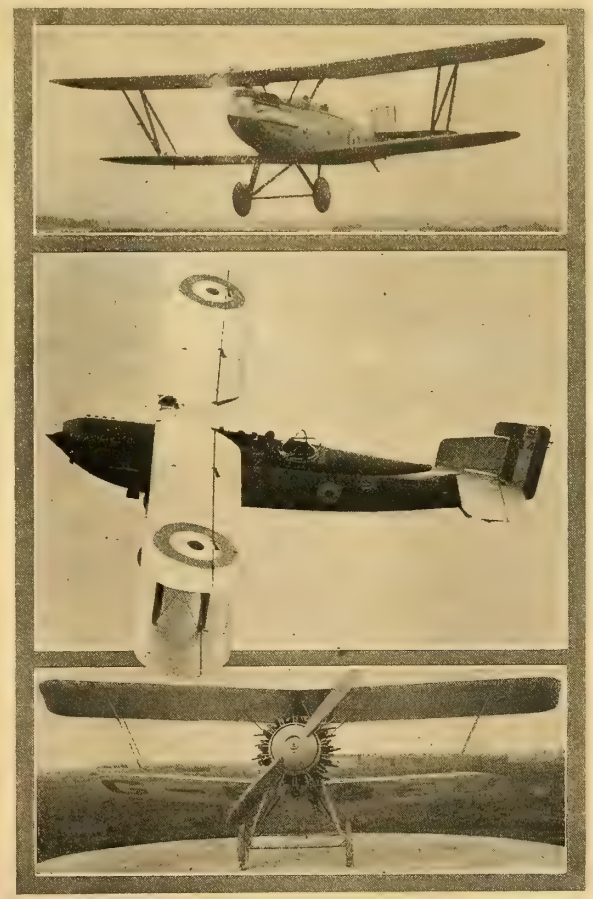
However, no more figures. They only tend to show who has the best potential chance of winning a war if it is declared tomorrow. In the case of Germany, with all due respect to my lord of Halsbury, her tremendous mileage is made in machines that are convertible to bombers only and useless for defense or, without scout escort, for offense, as far as that goes, so let us not have fear blindly and viciously where it is not completely justified.

But to go back to the raids and to the obliteration of London three times nightly. They have merely brought out the point once again and more dramatically than ever that the next war will be unique in that there will be no slackers, no ground hogs and no staff officers. Every man, woman and child will be a combatant as far as attack is concerned. All animal life will be elected to face the music. An interesting thought. How far will it go? No one can say. It may mean the end of civilization although that is a big order. Certainly, it will mean the temporary dispersal of cities in time of war. Great metropolitan areas will be untenable—it may be that we shall all go back to an agrarian state of life eventually. I offer no guess and I offer no solution. I do know, however, that what the Hague couldn't stop, the League of Nations can't stop, and, if the League of Nations can't stop it, Mr. Kellogg's Peace Pact won't, for the law of wars is blindly ignored in all this rabid treaty making, noble in purpose as it may be. The Law of War is the Law of the Dollar. When you invest your dollar, you expect a return, and if you invest it in terrific amounts in an army, that army must eventually fight and declare a dividend in the spoils of victory.

But there are no spoils of victory! War is economic suicide! Perfectly true—perfectly true. Every time there has been a war, the thesis has been proved once more that it does not pay—and once more children have grown up proud of their fathers because they were soldiers, and countries have gone right on putting money into armies. If you don't believe it, look at our own today and compare it to our army of 1912. Compare the C.M.T.C.s today to 1915 and 1916 when we paid out of our own pockets for uniforms, ammunition, food and transportation for the privilege of spending six weeks at Plattsburg at the beck and call of regular sergeants. Compare the French army of today with the pitiful troops she sent to the Marne. Look at England and remember the Contemptibles of 1914.

No, my friends, the lights will be out again and the sirens will shriek and people will dive into underground entrances as the overhead motors come nearer and nearer. High board fences will encircle demolished sections in the cold, grey light of dawn, and somehow we'll all muddle through once more. I remember a theatre bar years ago in this same London that was obliterated three times a night during the test raids. There was a sign in that bar that amused me and comforted me greatly one night. It read:

— Gentlemen —
You are standing under
Six feet of concrete. Drink
BLANK'S
Scotch Whiskey.



Top—Fairey Fox with Felix D-12 engine. Center—Fairey III F. Bottom—Siskin Fighter with "Jaguar" engine.

(Continued on page 857)

AERIAL NAVIGATION EXAMPLES

By
Lieutenant Commander P. V. H. Weems, U.S.N.

IN the June issue of AERO DIGEST there appeared an article by the writer on "Avigation Equipment". We now move a step further and give some examples to illustrate how this equipment is used.

DEFINITIONS

Hs Sextant altitude.
Ho Corrected sextant altitude.
Z Azimuth.
A Altitude difference.
W Watch face.
GAT Greenwich apparent time.
GST Greenwich sidereal time.
DR Dead reckoning.
GHA Greenwich hour angle.
LHA Local hour angle.
RA Right ascension.
Dec Declination.

It is possible that some of the readers studied the elaborate display on the back of the April and June Pilot Charts of the Upper Air, North Atlantic Ocean. A tip to those who do not have access to these charts: they will usually be supplied on request by the Hydrographic Office, Washington, D. C., provided the applicant makes certain weather reports. On the backs of these issues some problems are worked out. The ones appearing on the April issue will be reworked with the simplifications attainable by using a pair of second-setting watches.



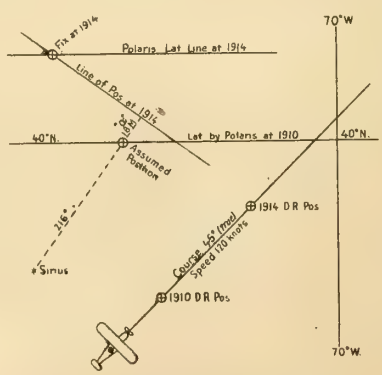
Lt. Comdr. Weems illustrating how sun sight is taken.

DISCUSSION

Every sight will give a line of position. One observation of a celestial body indicates that the plane is somewhere on the line drawn at right angles to the bearing of the body.

A single line of position is always valuable because its direction at time of sight is known. This line, combined with a line from later observations, establishes a definite "fix" (the word "fix" meaning here the best obtainable determination of the latitude and longitude of the plane). When latitude alone is known, the plane is on a line running east and west. When longitude alone is known, the line runs north and south. The line may run in any other direction and still be just as valuable; as, for example, when it lies parallel to the plane's course or crosses it at right angles.

A sight taken of a body dead ahead or right astern gives a line which informs the navigator how much he has overrun or underrun the reckoning. A sight taken abeam gives a line showing whether the course is inside or outside the intended track. To find at what time the heavenly body will bear abeam, ahead, or astern, open the Azimuth Tables in the latitude of the plane, and with declination of celestial body, find the bearing in the azimuth column; opposite to it in the time column is given the hour angle at which the sight must be taken. This hour angle is the angle, expressed in degrees or hours, that the celestial body is east or west of the local meridian.



Plot of position line for Sirius.

The navigator finding a celestial body available for observation should select, if possible, another body to be observed at the same time; the intersecting lines of position establish a definite "fix".

The daily work of taking sights will involve the selection of celestial bodies under varying conditions.

1st. The same body should be observed at frequent intervals in order to get two position lines cutting at an angle of 30° or more. The run of the plane is involved in this case. The body usually observed is the sun, which is generally found the most adaptable for a clear-cut visible horizon and other conditions. The "fix" here is liable to error, because the movement of the position line depends on dead reckoning involving errors of steering, drift, and wrong estimation of distance run.

2nd. Simultaneous observations of two bodies. Many times during daylight, when the moon is in quadrature, its position line makes an excellent cut with that of the sun. During the twilight or dawn, two planets, two fixed stars, a planet and star, or the moon with either star or planet, are available for observation. During times of the night when the horizon is distinct the same combination may be selected. Try to select those stars whose difference of azimuth approaches 90°, so that position lines may cut at a sharp angle.

3rd. Simultaneous observations of three bodies. At twilight, dawn, or during the night, with defined horizon, three fixed stars of good magnitude may be chosen. The bearing of the bodies should differ by about 120°. In the plotting, a triangle may be formed from the intersecting position lines; the true position of the plane in the triangle must be determined by the navigator, taking into consideration the probable accuracy of his observations and of his dead-reckoning position. Avoid all star sights when the horizon is uncertain unless a bubble sextant is available.

At the present stage of development of the bubble sextant, the errors that will at times unavoidably result from its use render it very unreliable. For this reason an ordinary sextant or a bubble sextant with the mirror depressed, using the natural horizon, is recommended. Conditions will undoubtedly be encountered which will make it impossible to use a natural horizon due to fog, haze, or low

(Continued on page 852)

INVERTED FLIGHT

The Inverted Turn, the Inverted Tail Spin, and the Inverted Loop are taken up in this second of a series of articles on Inverted Flight

By

Lieutenant Alford Williams, U. S. N.

IT is easy enough to maintain a constant air speed in inverted flight and to become accustomed to the results obtained from aileron movements, but to coordinate the operation of the three controls in executing a correct inverted turn requires study and practice.

The turn to be described will be a right turn from the viewpoint of the ground observer. The control dispositions necessary to make the turn, however, will be detailed from the viewpoint of the pilot who is flying the airplane.

Assuming "power off" and a flying speed of approximately 90 to 95 miles per hour, sufficient left rudder is applied to cause the airplane to swing in the desired arc while right aileron is applied to provide the requisite amount of bank. As soon as the rudder is applied there is a noticeable tendency for the airplane to fall towards the inside of the turn and assume additional bank. If the turn is to be of short radius, the necessary bank will be obtained by suitable aileron movement. Allowance must be made for the sluggishness of the lateral control and an early check correction applied.

It is rather singular that a pilot will never seem to worry about the wing which is above the balance position. Whether his airplane is flying in normal flight or in inverted flight his interest centers upon the low wing. His curious concentration upon this feature is the basis for his difficulties in instinctively handling his stick with reference to lateral control.

As will be noted later, the Curtiss Hawk will not fall into an inverted spin unless rudder has been applied while stalled invertedly. With this in mind it is urged that the pilot who contemplates experimenting with the inverted turn shall first have acquainted himself with the characteristics of the inverted spin. A poorly executed inverted turn may well develop into an inverted spin.

The apparent crossing of the controls can be readily cleared up. Let us survey the situation from the viewpoint of the pilot who is flying the airplane. In normal flight moving the stick to the right side of the fuselage depresses the right wing, and moving the stick to the left side of the fuselage depresses the left wing. In inverted flight, however, moving the stick to the right side of the cockpit raises the right wing, and moving it to the left side of the cockpit raises the left wing. It can be readily seen that as far as the pilot is concerned the wing movement relative to stick position has not been altered in any sense, and the stick is still moved in the direction in which it is desired the wings shall move.

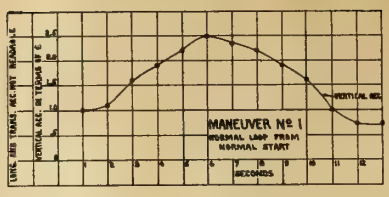
To summarize: in normal flight, to raise a low wing the control stick must be moved to the opposite side of the cockpit and away from the low wing. In inverted flight, to raise a low wing the control stick must be moved towards the low wing. Keeping this picture clearly in mind becomes extremely important when one is faced with the necessity of using the aileron control to aid and assist the machine (or, rather, wing movement) through certain variations of inverted flight, such as the inverted half roll, the inverted full barrel roll, both of snap type and slow type, and in the making of inverted turns. The controls have not become in any sense reversed, but are rather crossed, as far as extraneous reference points are concerned. There is a great deal of confusion on this point and it is attributable to the fact that the pilot's reference points are reversed. It would never do to permit the use of the aileron controls while flying in the inverted position to be included under the heading of "reversed controls". Unfortunately, the term "reversed control" is now generally accepted as applying to the rudder and elevator reversing their apparent functions at a forty-five degree bank. Beyond this bank the rudder apparently becomes the elevator, inasmuch as it will raise or depress the nose, and the elevator apparently becomes the rudder, inasmuch as it will swing the nose of the airplane to the right or left. This very common conception is unfortunate, for it leads to confusion that probably is accountable for a number of crashes. It is believed that this impression might well be cleared up and the correct operation of the controls achieved under all conditions of flight, normal or inverted, if the pilot would forget the reference of control action to the horizon and refer control action to the axes of the airplane, about which axes the controls always function in the same way, no matter what may be the attitude of the airplane.

The Inverted Tail Spin

After discussing the rudiments of inverted flight the attention naturally turns to a variation which has long been the subject of conflicting opinions, that is the inverted tail spin. Experiences involving this maneuver have been reported. Sometimes the story hinges upon the tendency of a certain airplane to fall unexpectedly into this sort of a spin; sometimes it deals with the difficulties of resolving the spin and resuming normal flight after the spin has been developed, and occasionally with the effort to bring the airplane out of the spin when it was found necessary to "rock it out". Witnesses have described the preliminary gyrations of crashed ships as involving some form or other of an inverted tail spin. In short, it is an actuality with which every military aviator should be familiar. It has long been considered as the worst possible variation of inverted flight.

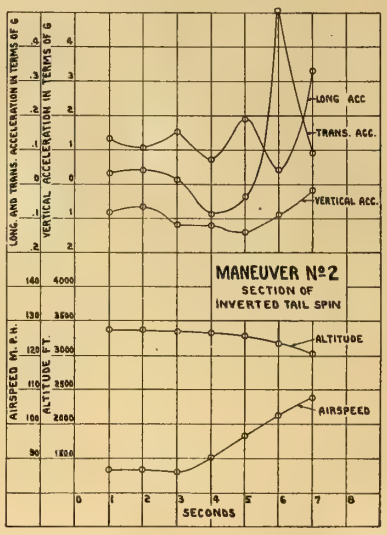
There is a decided difference between investigating the incipient stages of the inverted tail spin and actually permitting the spin to become fully developed and prolonged for a considerable period. The writer had a disastrous experience, which resulted in a crash, by ignoring this distinction while investigating autorotation. During that investigation the writer was interested in testing the spinning characteristics of a certain airplane which had the reputation of remaining in a spin irrespective of what was done to it. The test involved normal spinning only. The airplane was placed in a normal tail spin with great difficulty and permitted to make about two full revolutions before it was brought back to normal flight. The recovery had been sluggish and the airplane exhibited a peculiar response to the controls, but at any rate the plane had been brought back to the normal flight position. After this experience the writer was naturally of the opinion that the recovery from any spin was possible. So another spin was inaugurated and permitted to develop. About the conclusion of the third revolution the plane assumed a new attitude, together with a peculiar rotary movement which resisted all efforts to arrest it, and a crash resulted.

This experience demonstrated the distinction, noted above, between incipient spins and fully developed spins. Because of the experience just quoted and as a result of other investigations, the writer has adopted as axiomatic the rule that where difficulty is encountered in forcing an airplane into a tail spin, a similar difficulty may be expected in the effort to bring it out of the spin. While it is true that no untoward behavior was to be expected of such an excellent flying machine as the Curtiss Hawk, the writer was thoroughly prepared to abandon ship during the first experience of permitting an inverted spin to extend for a distance of 1,500 feet loss in altitude. No trouble developed, however, in this and numerous subsequent inverted tail spins involving losses in altitude of from 1,000 to 1,500 feet.



The average inverted tail spin possesses rather interesting characteristics. Let us assume the position of the pilot who is flying the plane, and describe the maneuver from his standpoint:

The airplane is in straightaway inverted flight, power off, rudder neutral, ailerons neutral, control stick slightly forward of neutral and being steadily and firmly pushed forward. As the flying speed decreases, all the controls give evidence of softening, and as a complete stall is approached there is an indicated air speed of approximately 78 miles per hour. At this point full left rudder is applied and the control stick is pushed forward as far as it will go. No aileron is used for the first test. The nose drops slowly and the airplane swings off in a slow left turn. At the one-quarter turn point the nose has dropped to an angle of approximately 40 degrees. The spinning movement develops slowly and smoothly. At the three-quarter mark the spin is in full swing, and from there on it is fast and of singular smoothness, with no tendency to develop a high and a low spot. In fact, the airplane's behavior impresses the writer with its marked similarity to the phenomena of the "flat spin". There is a sensation of excessive pressure against the safety belt, and considerable discomfort from blood pressure in the head. In addition to these reactions, the swift rotation renders the maneuver somewhat confusing. After the spin has fully developed, the air speed indicator settles down to about 106 miles per hour and remains approximately constant.

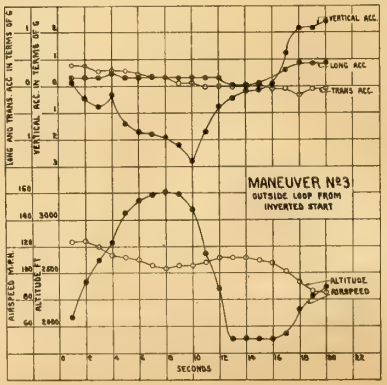


Prior to the beginning of the tests two precautions were taken. First, the pilot was securely strapped to the plane by a safety belt system running across his hips in such a manner as to allow full freedom of action while relieving him of all anxiety as to the security of the safety belting. Second, great care had been taken to determine that the control stick could not at any time get beyond the pilot's reach.

In this connection a very interesting point was noted. After the spin had been developed it was found that the control stick tended definitely to stay where it had been placed, and a definite pressure was required to bring it back to the neutral position. This feature was tested immediately in another spin, in which a slight change in the disposition of the control stick was made. The change involved the application of full right aileron, full forward control stick and full left rudder. The application of aileron seemed to have very little effect upon the characteristics of the spin, but it is believed that the lateral inclination of the wings was increased slightly. A confirmation was obtained of the tendency of the control stick to stay in the position in which it had been placed. This was an item worth noting and guarding against, for it is readily apparent that should the pilot be so secured to the back of his seat as to be unable to reach forward and follow the control stick through its full traverse (assuming of course the possibility that it might well slip from this grasp), there would be slight chance of checking the spin and averting disaster. Again, assuming that he had involuntarily fallen into the spin when loosely secured to the ship by reason of slack in the belt, it is quite possible that he would be unable to steady himself and retrieve the control stick. Too much emphasis cannot be placed upon the necessity of being firmly anchored and secured in the seat of a single-seater fighting airplane.

In an attempt to investigate the tendency to fall into an inverted spin from the inverted stall position the airplane was repeatedly placed in full stall and semi-stall attitudes, and in no instance did an inverted spin follow a complete release of the controls. In short, a spin would only take place as a consequence of the appropriate disposition of the controls. The attempting of inverted turns of short radius was productive of several incipient inverted spins, but the pilot's faculties are adequately warned as to the approach of such conditions, and the corrective redress is instinctive. As far as a pilot's personal store of information is concerned, the inverted tail spin is deemed to be the most important of all variations of inverted flight because it is the most confusing. It should be studied and mastered immediately after having acquired a working knowledge of straightaway inverted flight.

Generally speaking, this maneuver has been avoided heretofore because information concerning it is not a matter of common knowledge.



Recovery From An Inverted Tail Spin

(Half Loop Method)

If the spin has been initiated with power on, close the throttle immediately. Assume that the airplane is in a left spin (left from the viewpoint of the pilot who is flying the ship; right from the ground observer's viewpoint). The control stick is full forward and to the right, the rudder is in full left position, air speed approxi-

mately 100 to 106 miles per hour. Neutralize the rudder, neutralize the ailerons, draw the control stick aft firmly as far as it will go. These control dispositions will immediately resolve the spin into normal flight by the execution of a half loop. Just prior to reaching normal flight position, still holding rudder and ailerons neutral, move the control stick to position slightly forward of neutral, in order to maintain sufficient flying speed.

Should the spin have been of long duration and fully developed, a full turn and a half or two turns may be required to stop the circular motion. But it is to be noted that the control disposition detailed above will stop the spin and bring the airplane back to normal flight, and impatience will not hasten the resolution.

Impatience and uncertainty as to just what to do with the controls appears to have been the basis for the much talked of mysterious method of "rocking" airplanes out of spins. If the airplane is in balance and of normal design it cannot be forced by the violent oscillation of controls to perform any maneuver which could not be effected by a single smooth and decisive disposition of the control stick and rudder.

It is quite simple to visualize an airplane in the stalled position in either normal or inverted flight where sudden and large control movements would do nothing but accentuate the stall. Finally the stall might reach a point where the airplane's nose would fall away to an attitude which would result in increased forward speed. With the increase in flying speed would come a stiffening of the controls and the pilot might be led to believe that he had solved the trouble by "rocking the controls".

The half loop method was used for recovery from an inverted spin which had been permitted to continue for approximately thirteen hundred feet. After coming out of the spin to the normal flight position, the pilot was amazed to find himself possessed of the impression that he had fallen into a normal spin. Even though his vision had become somewhat blurred he perceived that the horizon was generally in the position indicating normal flight. This vague reference, checked against sensing the neutral rudder, neutral aileron, elevator just forward of normal neutral, induced him to hold on for a few seconds. Checking back it was realized that the pilot's senses had deceived him and this brought home the realization that an inexperienced pilot might readily come to grief while laboring under such a misapprehension. Those who are interested in investigating inverted spinning should keep in mind the reaction feature just discussed. Knowing what to expect is highly essential, for it considerably lessens the hazard.

This writer personally chooses to resolve the inverted spin into straightaway inverted flight and then into normal flight by the half roll method. It has been found much easier to resolve the circular motion of the spin into a straight inverted glide by offsetting the rudder slightly and easing back on the control stick rather than to attempt the additional purpose, with additional confusion and reaction, of attempting to resume normal flight at the same time. American military single-seater fighting planes are so well designed and fabricated that they may be expected to go only where the controls direct them, and to stand up under the reasonable stresses to be imposed.

The finished military aviator should be thoroughly familiar with the inverted tail spin, its characteristics, the incidental physical reactions and the methods of resolution therefrom to normal flight. This misunderstood maneuver should be deliberately and vigorously practiced and stripped of its mystery.

The Inverted Loop

Considering the normal, right-side-up loop as the basis of all forms and variations of loops, we find that this loop is started at the bottom of a circle and concluded again at the bottom of the circle, with the pilot inside the flight path. This analysis suggested an idea: Why not attempt a loop to be begun at the bottom of the circle and to end there, wherein the pilot would be on the outside of the flight path and the lift reversed on the wings, and wherein all conditions of the normal loop would be reversed. The control dispositions necessary to effect such a loop were studied and the evolution accomplished in the following manner. The difference between the speeds and accelerations mentioned in the description of the various maneuvers and those indicated on the charts is attributable to the fact that development in execution permitted lower initial speeds with consequent reductions in accelerations.

The airplane was half rolled to the inverted position and held there until an air speed of approximately 185 miles per hour was indicated. Sufficient rudder was applied to overcome the engine torque, and the control stick was slowly and firmly pushed forward approximately one-half the possible stick traverse, forcing the plane's nose straight up from the immediate horizon, across the sky to the opposite horizon, and then on down and back to the original horizon. During the climb up the first side of the loop a steady deceleration in speed was noticeable. At the top of the loop the forward speed had fallen to forty miles per hour, and at this point the stick was pushed as far forward as it would go while the airplane appeared to hesitate and waver from side to side. Considerable over-control of aileron and rudder was necessary at this point to maintain a straight flight path.

In the downward path from the top of this loop, the stick was left flush against the forward stop and the speed mounted rapidly to approximately one hundred and seventy miles per hour. During this maneuver the strain against the waist belt was considerable. The graphical records, Figure 3, cover a later attempt wherein a vertical acceleration of minus 2.8g is indicated.

A noticeable difficulty was experienced in maintaining the proper amount of rudder correction to offset the engine torque. The difficulty was attributable to the complete absence of reference points while traversing a clear sky from horizon to horizon. This was a decidedly new experience and it is believed that the aggravated physical reactions, of prolonged blank vision period and the development of excessively high blood pressures in the head, were caused by the crude flying which marked the first attempts. Repeated efforts and constant practice in performing this maneuver brought such acquaintance and information as to enable the repeating of the evolution with greatly minimized physical discomfort and at lower starting speeds.

The first half of this loop is of decided value in aerial combat work. By the first half is meant that part from the inverted position at the bottom of the loop which places the plane in normal flight and travelling in the opposite direction. It effects a quick change of direction with considerable gain in altitude and is very likely to cause confusion to the pursuer. This form of inverted outside loop was investigated from many angles and attempted at various speeds but the chart, Figure 3, is pertinent only to the advisable method for accomplishing the evolution.

During some of these sideline investigations, the writer was very much impressed and amused by the unintentional wanderings of the rudder bar, while his entire attention was focused on some other *(Continued on page 851)*

AIR—HOT AND OTHERWISE

What a Show!
A Life-Saver for the N. A. A.

By Frank A. Tichenor

ACROSS the continent and, in course of time, down the Western slopes of the Sierras we hastened to see the Air Show at Los Angeles—and didn't find a chance for one night's sleep again until, ten days later, we were returning.

Oh, boy! That show! Sliding into esses we find stupendous, superb, spectacular, stirring, flowing swiftly, irresistibly from our fountain pen, but only slightly expressing our startled, surprised and super-satisfied sentiments. "Scat my cats!" as David Harum used to say. Yes-s-s and then some.

S, in connection with that show, represents success in splendid surplus.

Those Californians had promised the greatest air show ever held in this old world—and they gave us all of that.

They picked for it the finest natural setting to be found in their incomparable collection of such matters and then their human handiwork came pretty close to being fit to match the glories of the Lord's.

Paint in your mind the picture of the Sierra Nevada mountains as the background of a magnificent flock of planes, sailing like migrating birds toward an appointed destination. For further background try to visualize such sunrises as you never dreamed about before, such clouds as you did not know that vapor had the wisdom to compose, such gorgeous evening skies as Turner in his painted ecstacies hung above his oil and canvas glories of old Venice, noonday clarity which sparkled as if one might be within a perfect diamond and looking out, a paradisiacal temperature neither hot nor cold, those mountains ever back of all. . . . And then—

Where five weeks before had been an oat crop now was a permanent flying field, the perfect product of sheer magic, efficiently laid out, magnificently equipped. Beside it, where five weeks before had been nothing whatsoever, now rose the biggest exhibition building ever erected on the Pacific Coast.

Add to these sheer wonders all the others you can think of when your mind is really active and you will have one half of an idea of what the California Air Race Association had done for aviation while nobody was looking.

Not a detail missing. Greatest ever. Worthy of the world's newest and perhaps greatest art and industry. Worthy of the Golden State. Worthy of America!

Too much praise cannot be given Dudley Steele, Cliff Henderson, Harry Wetzel and others of the dominating spirits in this most magnificent of air shows.

We concede the California climate without a single quibble. The Californians were so sure of it that they built their exposition buildings without roofs!

After the first day the crowds were—well, they were "capacity", as the theatre-men say—and "capacity" in this case, was darned near all outdoors. Remember, that everyone who went to this astounding exposition had to get there in a motorcar and you will have something to think over. Thursday, Friday and Saturday and very emphatically Sunday the grandstand gates were closed before noon.

Air-minded? More so than any other part of the United States. Miss California, ladies and gentlemen, once more takes the rostrum as the schoolma'am of the nation. Ask her your questions about aviation and then listen while she answers.

Everybody flies in California. Over thirty landing fields dot the Los Angeles territory alone—all active and conducted as a part of everyday life. In California flying is both a regular business and a popular, accustomed sport. There's no ballyhoo about it.

I arrived upon the Coast a few days before the opening of the Show. Impressed by the crowds I saw at the first landing field I drifted to, I remarked that the visitors and contestants for the big show were coming early. The manager of the field looked at me with a worried and perhaps suspicious eye. Another eastern nut, no doubt, my mind, if any, perhaps affected by the altitude on the way out. What I had thought visiting planes were the machines of regularly operating airlines and those of habitual resident fliers—Californians who fly as casually as they eat or ride in motorcars. These Californians fly home from their jobs, and then take a turn or two around the home locality. Then they land for dinner, which they eat while the plane stands casually outside as New York suburbanites park their Fords. Having eaten they take another little flight, perhaps two hundred miles or so to play a game of bridge, but more likely a delightful little journey just for the love of flying. In the morning they fly back to business.

To me it seemed as if an irresistible wind must have driven all the planes upon this continent to the shores of the Pacific and that the light-headedness of the air-minded had made them float along on the same breeze, even if they had no planes. Big, little and middle sized, physically, mentally, financially and officially—all were there. The mentally big ones especially. General Fechet, Admiral Moffett and that very usefully air expert statesman, Congressman Frank James of Michigan, were on hand, to mention only a few well known, significant names. Peter F. Brady, the New York banker, all the Eastern and Western and in-the-middle-between aircraft manufacturers, flying men whose very names will make any flapper gasp and clutch her heart—in fact everyone that IS anyone whatever in the air of the United States answered "present" to the roll call.

That lovable character, Mother Tusch, of Berkeley, had moved the hangar headquarters to Mines Field for the week. In her home anyone who flies is welcomed.

Every intelligent human being on the West Coast, from Seattle to Tia Juana, knows more about flying today, than, tied up in bundles of twelve each, Eastern people know per bundle. The West Coast had a continuous educational course in aeronautics during this great week which this year will do as much for flying in this country as the combined efforts of all the flying schools which we possess. The West Coast knows that flying is a practical, a speedy and a safe means of travel because it knows people who travel that way and travels that way itself. The face of the whole West Coast was freckled for ten days with the fleeting shadows of the myriad planes which soared above it. And the people of the West Coast, because of their incomparable climate, live out in the open, and so, when planes fly over them, they see those planes go by.

The buzz of a plane or two is audible everywhere between the mountains and the sea, almost every minute every day. We have on our Pacific side a land of wonders where, first, God did his very best and, afterwards, man has done far better than he usually has done elsewhere. The best efforts he has ever made are those which now he makes in aviation. Of this boldest of his achievements he gives his most striking demonstration. *(Cont. on page 854)*

THE ROAD TO TOMORROW

By Don Rose

JUST the other day I saw a horse. It was a real, live horse, and it was pulling a carriage down Fifth Avenue, New York. The horse looked very much surprised at Fifth Avenue and so did the carriage, while the driver looked positively paralyzed. There were hundreds and thousands of people out on Fifth Avenue, and since I couldn't see any parade anywhere, I figured they must have come to look at the horse.

I know that some of you won't believe this, since my reputation is what it is, but it's a fact. I can produce two other people who saw the horse, and one of them is frequently sober while the other lives on Washington Square and cannot tell a lie. They both agreed that it was a horse. They will swear to it.

Some of you younger fellows who have never seen a horse may be interested to hear what one is like. The rest can go sit on a tack, and I want to tell them right now that they will be more comfortable on a tack than on a horse. But those of you who are interested in the dim and distant past, when horses roamed the streets and highways and western plains, when twenty miles was a day's traveling, when men were men and women liked 'em that way, ought to know about horses. How can you know what horse-power means if you don't know a thing about a horse.

A horse is a large square animal, made up principally of horse-hide, horse-hair and horse-sense. It has four legs, one at each corner, which are placed there in order to keep the horse's stomach off the ground, and to this extent it resembles an ordinary bridge table. It has a head in front to keep the passengers from slipping off in that direction, and about midway along its fuselage is a saddle to keep them from sliding off the rear elevation. At the side are stirrups, but these are not strictly a part of the horse.

The horse's fuselage is of heavily ribbed construction, and is only slightly streamlined, except in racing models. The tail is adjustable, but the horse does not respond very well to rudder control and there is no stabilizer. Lateral balance is unusually satisfactory so that the horse will cruise on an even keel with hands off, but longitudinal balance is not so good. High speed, about 25 m.p.h., low speed 0 m.p.h., cruising speed, about 10 m.p.h. Cruising radius about 20 miles on 1 gallon of oats and a bucket of water. Landing speed all depends on how and where you land.

It is considered bad form to use a ladder to get on a horse or to climb up by the tail, and while the pilot may be lowered into position by a derrick, this is not always available. The rider should therefore learn first of all how to mount a horse, though the horse can be trusted to suggest numerous ways of dismounting. Place the horse facing north and south. Approach the left or port side, gently murmuring "Gee" or "Whoa" according to the gender of the horse and feeding it lump sugar rapidly with the left hand. Place the left foot firmly in the stirrup, and leap lightly but gracefully into the saddle. Care must be taken to estimate accurately the exact muscular effort required or the rider may go clear over the horse, which is unnecessary as we are not playing leapfrog. If properly executed, this maneuver should leave the rider facing in the same general direction as the horse.

Hold the horse firmly between the knees to avoid losing him, gently release the clutch or bridle, and proceed forward in an elegant and dignified manner. It will be found that a good saddle horse has about six different gaits or gearshifts, which have distinctly different effects on digestion, liver and life insurance policy. A horse has, however, no reverse, in which it strongly resembles an airplane. Novices may find it advisable at first to ride standing up, for which the stirrups will be found convenient. This may possibly obviate a great deal of standing up later on.

This little scientific discourse is intended to show how interesting some of these prehistoric animals are. There are a lot more of them, such as the megatheriums, the paleomastodons, the sabre-toothed tigers, and the deep-sea turtle, the land-lubber admirals and so forth, but I reckon the horse is about as interesting as any. And it is even more interesting to wonder what has become of them all. Some of them are totally extinct and some are getting extincter every day. That's the price we pay for progress.

You fellows who have never seen a horse have no idea how much and how quickly the world has changed since it developed a taste for gasoline. We older folks still remember enough to make comparisons, but the younger generation has enough to do to keep up with the times. People today scarcely get used to one new marvel before they stub their toe on another. Even the toughest of the old traditions weaken and disappear under the strain of this dizzy world, and all the certainties and stabilities and settled habits of the last generation are crosseyed and woozy from the wallops of the present. Even the great American home has lost its proud standing as a shrine and sanctuary for conservatism. Through all the chances and changes of the last century, home was still Home, Sweet Home—the place where the pan under the refrigerator overflowed three times a week. Now the refrigerator has gone electric, together with the washing machine, the radio, the furnace and the mantel clock, and the last link with the past is busted.

I took a short vacation lately, up in the Catskill hills. You may enter the Catskills by way of Kingston-on-Hudson and find your way west and north over concrete roads spotted every half-mile with hot-dog dumps and gasoline pumps. You go past the Ashokan Reservoir where is kept the water supply of New York City, and the natives tell you it holds enough water to cover Manhattan Island thirty feet deep, which they seem to think is a very good idea. Then you strike upwards and onwards into the land where Rip Van Winkle took his long nap. He got himself delicately pie-eyed with schnapps, had a row with his wife Gretchen, and went off with his dog and gun into these valleys and hills to get over it all. There he fell asleep and woke up twenty years later with a bad hang-over and no wife, dog, or gun to speak of.

Stand on a mountain top as the sun goes down and you can easily believe every word of it. Over in the west black shadows have taken hold of the mountain slopes, and the valleys between are misty blue with dusk. The farthest line of the hills is black and sharp against the changing sky, and the evening star stands a while above a mountain peak like a forgotten lantern. Mystery deepens in the silent valleys, no different now than in an evening of old Knickerbocker's time, and the cool breeze that follows after the sun whispers of strange and secret doings deep in the shadowy hills. Somebody tells of a local legend that Rip Van Winkle has gone back to sleep in his old haunts, and while the mood is on

(Continued on page 848)

AERO DIGEST

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WAS IT WORTH WHILE?

NO doubt the vastness of the crowds at the National Air Races was in part due to the fact that Army and Navy fliers were scheduled to do literally death-defying acrobatics in the air as only the talented and heroic fliers of those two services can do them.

The writer was one among the multitudes who thrilled and marvelled at the hair-raising exploits of the Sea Hawks, as the Navy stunters call themselves, and the Musketeers, the Army group of aeronautic acrobats, as they exhibited at Los Angeles.

Tens of thousands cheered these fancy fliers frantically as they proved that fear has no place in their hearts and that skill tingles in their veins, a quality of their very blood. They proved to the great and gasping crowds that they have been trained to risk their lives for their native land without a thought.

But was it worth while to sacrifice as brave and valuable a boy as Lieutenant Williams so that that crowd at the Air Races might be entertained? Those people had paid for thrills when they had bought their tickets of admission, and they found them when this splendid flier died before their eyes. In the same spirit ancient Romans went to the Colosseum to see gladiators fight the lions.

We doubt if shows of this kind, which needlessly and extravagantly endanger precious and highly trained young men whom the nation badly needs, are really worth while.

The crowds cheer. The aviators die. The crowds sigh and go again next time, with the unacknowledged hope in their hearts that they may have another thrill!

That does not advance the art of aviation. It does not assist in the development of America's air defense. It does nothing worth the doing. We shall not call it murder, as Williams' mother doubtless calls it in the bitterness of her grief, but we do not hesitate to call it vicious and destructive of many things we value besides the human life which it so coldly sacrifices. It is wholly inexcusable.

KILLING A GOLDEN GOOSE

A CERTAIN group of air industrialists, which has very largely profited through its operations in connection with American aviation, is now proceeding in a way which promises seriously to injure, although of course nothing could kill, the goose which has been laying golden eggs for them and which, if rightly nourished and protected, will lay many of incomparable value for the nation and the rest of us.

The promiscuous inflation by promoters of commercial values associated with our aircraft industry will do no one any good, least of all its present principal promoters. It must not and will not continue.

Discounting the future of aeronautics will have a result as disastrous as similar procedure once had with regard to railway values—and that came as near as any one financial madness ever did to spreading general ruin in America. In motion pictures, later, and, still later (and not long ago) in radio, similar insanity and crookedness have resulted in similar disaster for the innocent and foolish.

Hundreds of millions of dollars have been lost in various American industries which should never have been treated speculatively as the result of unwise speculation stimulated by selfish men in whom the people of the nation had less reason to feel confidence than it has to trust the leaders of the aircraft industry which so far has been mostly free from financial deviousness of any sort.

We who in every way are interested in seeing the industry develop in all its various details in a manner safe and sane, very definitely and emphatically decry the recent procedure of these self-appointed leaders of the industry who, having, they are careful to indicate, achieved "inside knowledge" and "ground floor positions", now pretend to offer leadership but really prepare to take such courses as indicate their determination to "clean up" and let whoever may be mulcted for the bill. It will be the public's pocket which they will be picking; it will be the air industry's future which they will be endangering.

The fact that a few may make fortunes won't help to stabilize the growing industry into that paramount importance which it should and must have.

Eighty-five per cent of the recently formed new organizations with high sounding names are headed toward financial nose-dives.

The banking houses which underwrite and the stock selling houses which dispose of the securities may make millions out of the formation and promotion of these groups, but the investor certainly will lose. Soaked and over-capitalized watered stock will shrink with terrifying speed when it begins to dry.

AERO DIGEST earnestly hopes that it may not be compelled to call any of these enterprises specifically to the attention of the Attorney General. It is well to make announcement, though, thus early in the day, that we shall not stand idly by while anybody risks the future of the industry.

UNIFIED DEFENSE

FOR many years we have been urging for this richest nation of the world the creation of a Department of National Defense. We hope and believe that Congressman Frank James has found the way out. He is now its chief exponent down in Washington, and not only is he a man who does things, but, as a ranking member of the House Military Affairs Committee, he is in a most favorable personal position for the exercise of his abundant energy and indomitable will at this particular task.

Elsewhere in this magazine will be found an article from his pen in which he advocates the immediate creation of the new Governmental machine so obviously made necessary by the changed conditions which confront us in this age so different, even, from the period immediately preceding or during the World War. Without here going into details of the idea so ably explained in his own words upon those other pages, we nevertheless feel impelled here to call attention to the fact that apparently there may be some particular need at this precise moment for carefully considering this and associated matters.

He is convinced that the suggested Department of National Defense completely will eliminate most of our difficulties, including rather especially the squabbles which have complicated Army-Navy coöperation from time immemorial. He believes, also, that the plan will do away with many duplications and prevent great wastes.

It is our belief, also, that Congressman James' plan, put into intelligent operation, not only would add greatly to our national security, but would save millions.

"SEE AMERICA THIRST"

By

by Caldwell

WELL, I suppose you six readers thought that I must have joined the Navy in order to see the world—I've been talking about it for the last three months. But all I saw were a few holes in battleships, and you can see holes in those things any time anyone hesitates above them with a bomb. Also, I figured out that if a man joined the Navy as a critic it would take him quite some time to work up to be an admiral. Besides you really don't see as much of the world in that Navy as the recruiting posters might lead you to suspect. You generally get posted to some place like the Philadelphia Navy Yard, or that other comic one beside the Potomac, and just lie around while the barnacles gradually collect on you. In fact, you can spot the old Navy man at a glance merely by counting up the number of barnacles adhering to him. Like the rings in the trunk of a tree, you know—so many rings, so many years' growth; so many barnacles, so many years' shrinkage in the Navy. When the weight of barnacles exactly equals the weight of the man, they retire him. They've got a flock of old boys who are past due at the scales right this minute. But I'm going to leave the sea pigs alone for a spell because I've been writing about battleships for so long that I have rust on my typewriter and get a sinking sensation every time I see a little water.

Not that I've seen much of that stuff during the past two weeks, for I've been flying over the deserts of Arizona and New Mexico, and have attended the National Air Races at Los Angeles. And you know how much water the boys use at Air Races, don't you? The morning bath, that's all. Then they're through with the stuff for the day. One pilot at the field wasn't feeling well, and someone threw a glass of water on him. The shock nearly did for him.

But I must tell you how I came to see America first, before the Outdoor Advertising people got it completely covered with billboards. You see, I had been sitting down in Hokumville on the Hudson for quite a while—ever since I got back from Haiti last winter. And I can only sit still for just so long anyhow; besides, it's cheaper to move on an expense account than it is to pay rent. So last July I decided that I had been sitting long enough on the bank of one river. In fact, I got so that I could recognize the driftwood as it went up and down with the tide. There was one log that went by me seventeen times. It got sort of monotonous after a while. And then I noticed that moss was growing on my North side and that I was starting to lean to the South like a tree. So I knew it was time to move before I took root and became a permanent New Yorker, which is about the most permanent thing there is, except the theological views of a Fundamentalist.

About that time the B. F. Goodrich Co., who make Goodrich Silvertown Tires and hot water bottles, went and got themselves a Fairchild Cabin Monoplane with folding wings—a very useful feature in case you're flying through the Grand Canyon or any other place where you're cramped for space and need to draw in the wings a trifle in order to get by. And as my old friend Henry Wacker, the demon tire salesman of the Goodrich Co., intended flying around the country, I decided that it would be a good move for me to go and fly Henry for a spell. That was three months ago, since when I have flown over 14,000 miles on I don't know how many gallons. The Whirlwind is averaging eleven gallons per hour and I'm averaging one pint per room. That's at cruising speed. When I meet George Haldeman or Billy Brock or Ed Schlee I rev up a trifle.

Of course you know those three—? George, the Atlantic bathing beauty, Billy, the Paul Whiteman of aviation, and Ed, the gentleman who pays the White Rock checks. They're fine boys with just one peculiarity—they have the same effect on me as pretzels. They're thirst inducers. When we four get together we bear a strong resemblance to a herd of camels in the middle of the Sahara, seeking an oasis. And invariably our search is crowned with success, if we're unhampered. That is to say, if the dear little wives are parked. Last month in Detroit, for example, the sweet helpers were with us, and we enjoyed a lovely family dinner, washed down with clear, cool spring water that I found to be most refreshing—it reminded me of my childhood. I wish you could have seen the pleasant picture of American family life that we presented—all eating onions and drinking water. It would have done your heart good. And, like enough, you'd have said to yourself with patriotic fervor, "Ah! America is safe so long as she has solid substantial men like William Brock, filling themselves with water and green onions."

But getting back to America and what I have seen of it so far, you six patient readers are invited to take a flight with me from New York to Los Angeles, and return as far as Wichita, where I'm sitting writing this. If I stop meeting old friends with distended hip pockets I'll eventually get back to New York. But I'm in no hurry. By the way, if you've made this trip yourself you may turn at once to the ads and save yourself time. If this was printed in *Liberty* they would tell you at the top of the article just how many minutes and seconds you would save by not reading it —a very good plan that has saved me I don't know how much time. I wrote Elliott Springs the other day and told him I had saved fourteen minutes and sixteen seconds by not reading one of his stories.

Through the courtesy of the Goodrich Co. I was able to take Mrs. Cy along with me to the races, which was very lucky for her, as I didn't have the fare to send her out by train. And it was lucky for me, too, because at air races it's always well to have one member of the family along who knows when it's time to quit. Eddie Stinson usually takes Mrs. Eddie along, too. You miss part of the show that way, but you feel better next morning and don't shudder at the sight of a boiled egg.

We flew from New York to Albany and heard Al Smith deliver his acceptance speech in the rain. Even the weather was wet, so I figured Al got off to a good start. But just as soon as he stopped speaking the clouds passed, which I took to be a bad omen for the Cause. I'm afraid I'll be getting it from the same sources during the next four years, even allowing Al could do more than pave the way for it. But I don't want to sadden any of you other Democrats, so I'll move along to Buffalo, which is right near the border and is a pleasant point of departure for the Big Dampness to the North of us. There we saw hundreds of Americans crowding across the Peace Bridge to Canada. And when they came back they looked twice as peaceful and contented as they had looked before they

went over. There must be something restful and soothing about the Canadian air. I heard one returning American say, "And to think we got away from King George in order to find freedom!" Then he leaned back in his taxi and was crying softly to himself as he disappeared from view. There's a lot of pathos in Buffalo, my friends. I was just about to sneak across the bridge myself when Mrs. Cy said, "And where are *you* going, may I ask?" And I said, "No place." And I was right.

Next stop was Cleveland, a place near Painesville, on Lake Erie. The principal industry in Cleveland is apologizing for the old Union Station, built in 1852, and explaining how fine the new one will be when it's completed in 1952. Between explanations the citizens go out to the Municipal Airport and watch Manager Jack Berry's two tractors at work stirring up the dust. Largely through Jack's efficient management they have a fine airport at Cleveland, and as soon as the City Council sees its way clear to buy a lot of concrete for aprons and roads, they'll have one of the finest in the country. They claim they have now, but I'd admire it more if I didn't have to wear a gas mask and carry a whisk broom. However, after California and Arizona I won't think Cleveland field a bit dusty. I didn't know what dust was until I hit those places. In Cleveland you at least change to mud occasionally. But when you folks come to Cleveland for the National Air Races next year I'm betting that you will see neither dust nor mud, but instead long stretches of fine concrete. Give Jack Berry enough money for the job, and don't bother him, and he'll produce an Airport that will knock your eye out. Only thing is, come by air. Don't land at that old station or you'll think you're back in jail.

At Cleveland we picked up Clifford Gildersleeve, Secretary of the Cleveland Chamber of Commerce, who turned out to be the Perfect Passenger. After toting him across the continent I recommend him highly to anyone who needs a passenger. He sits still, doesn't ask nut questions, hands the pilot gum, sandwiches, water, or what have you, and doesn't take a death grip on some part of the airplane every time he makes a landing. If there's anything that discourages a pilot it is to glance around at his little flock of sky-riders and see them clinging like grim death to the structure of the ship for fear the pilot is about to dash them against the earth. Henry Wacker and Mrs. Cy both are good passengers—of course they've done quite a lot of flying in the last few years. But this Clifford was outstanding. He never complained once, even when I nearly wrecked him at Indianapolis.

Indianapolis—keep out of Schoen Field and go to the new Municipal one. That Army field wasn't too bad when we landed on it during the first Ford Tour. But it has failed since. Senile decay is upon it. We landed smooth and easy, near the hangars, and received a kindly welcome and good service from Lieut. Peck and the Army boys, who even sent a car out to the far end of the field to show me just where to take off. "The field is a little rough," they said. "Follow the car." Well, I followed it out, turned into the wind, and came charging toward the hangars. Before I even got the tail off the ground, the wheels bounced off a hillock into the air, then slammed down on the next little hill, off that one to the next one, and to the next, and so on, and so off in due course. They put good landing gears on those Fairchilds, believe me. If they hadn't, that one would have gone back home by flat car, and we might have followed it in the baggage car. But everything held and we were off to view Indiana, stronghold of the Koo Koo Klucks Klan, whose former Grand Dragon is now doing his dragoning from the State Prison, I am very happy to report. When a man has to hide his identity in a white nightgown in order to get his opinions across anonymously, it seems to me that there must be something wrong either with his opinions or with him. I suggested to the crew that we should put on our nightgowns in case we had a forced landing in Indiana, but the Whirlwind kept on whirling, so we sailed through. Very pretty scenery, too. And the animal life was interesting. We could see little herds of kleagles kropping the grass, and hear the little klams in the klear waters krooning to their mates as they kommented on the koolness of the brook. What Indiana needs is a good dose of salts.

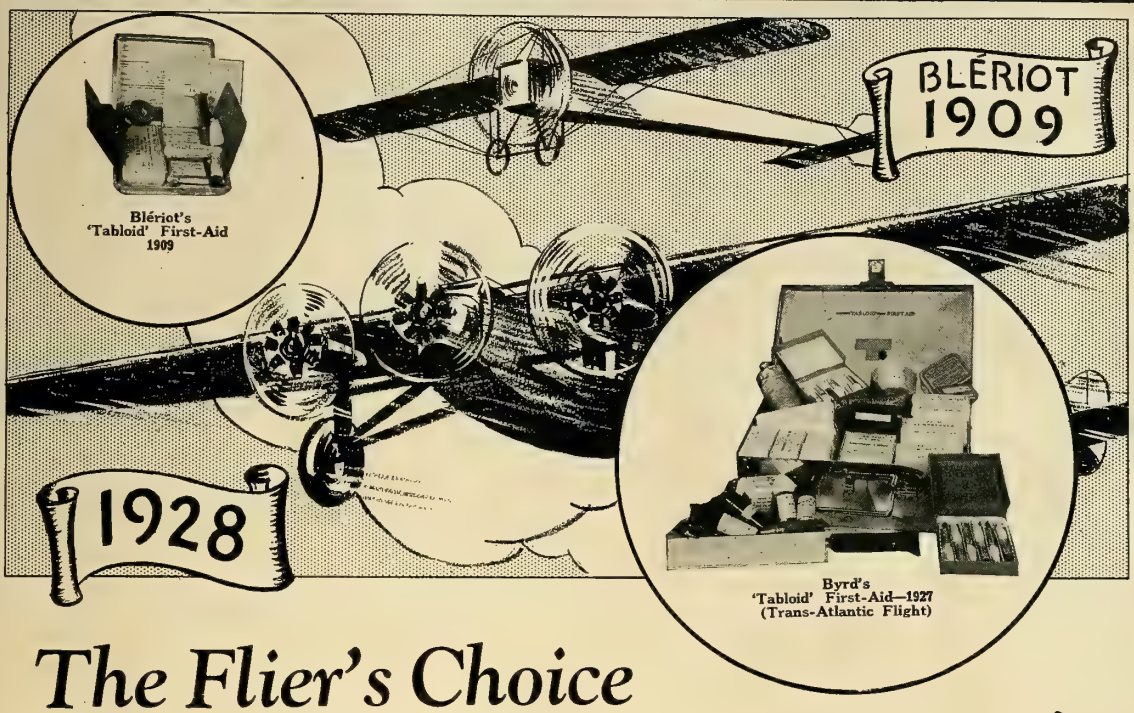
We went through Illinois too far South of Chicago to hear the bombs and machine guns, and struck the good old muddy Mississippi at St. Louis, where a feeling of sadness almost akin to desolation, came over me. There were tears in my eyes as I thought that I was looking down on the home of one of America's greatest patriots, a man who in the past has done such splendid service for his country—Mr. Anheuser Busch. I thought of all the brown bottles filled with foamy beer that had passed through his hands—and down my gullet—and, frankly, I broke down and wept for the dear dead days of long ago. "When you and I were young, Muggie!" Dear, dear, how sad! Now all they make there is Listerine. Our breaths may be better but we don't feel nearly so good.

Next day we had a beautiful flight along the Missouri to Jefferson City, and then right across Missouri to Kansas, stopping at Chanute, where Mrs. Cy used to live as a child. Her grandmother and grandfather moved from Indiana to Iowa in a covered wagon, trading with the Indians en route—one bottle for several skins, I suppose—and settled in Wayne County, Iowa. They built a log cabin and proceeded to raise corn and kids with such hearty good will that Grandmother Hawkins had eighteen children in that one cabin—and if that isn't a record for one cabin, then bring on your cabin. One of Grandmother Hawkins' children—my wife's mother—married and after a time moved to Chanute, making the move by train. When she was still a little girl my wife's people moved to Saskatchewan, Canada, where she grew up and finally got smart enough to return to the States. And now, after all these years, she was returning to the Great West in a modern Covered Wagon of the air. I wonder what old Grandmother Hawkins would have said if she could have seen her little grand-daughter returning to Kansas at a speed of ninety miles an hour? Well, Grandma still holds the cabin record.

We only stopped long enough at Chanute to say howdy to Uncle Henry and Aunt Belle (and these folks whose ancestors came out in a covered wagon now run a filling station), then we pushed on to Wichita, center of the aviation business of Kansas at least—and if you ask Walter Beech he'll say the center of America. When I returned here yesterday, Al Smith was passing through. And right outside the station, in front of the statue of Carrie Nation a determined looking woman was bawling her head off in a political speech whose slogan seemed to be, "Down with Smith and the likker traffic." There wasn't the least doubt that I was back in Kansas.

However, we're still on our rambling way out. Next day after an evening's prayerful session with a few of the boys we took off for Amarillo, Texas, gassed up, and took off again for El Paso, which we made by seven o'clock, flying ten hours that day, which is exactly five too many for comfort. After leaving Roswell, New Mexico, we started to climb over the

(Continued on page 842)



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REPLY TO "THE BATTLESHIP BUBBLE"

By Commander W. W. Webster (C. C.), U. S. N.

ALTHOUGH in the Navy, the writer is in the peculiar position, along with a very few other officers now in aviation construction, of having technical training and experience on both sides of the Airplane vs. Battleship question, and is therefore prejudiced toward no side but the truth. He is a graduate of the Naval Academy, was trained and performed duty as a Naval Architect and constructor for nine years, but for the last six years has been in airplane design and construction work, to which he voluntarily transferred because he believed firmly in the possibilities of aviation and its growing importance in Naval warfare. This belief he still holds. However, with all the evidence at hand he can find no room for disagreement with the stand of the Naval authorities that the belief that the battleship is rendered obsolete by aircraft is, at the present stage of aviation development, an extremely fallacious and dangerous conclusion. What the future may bring forth is an entirely different matter, but he feels safe in predicting that the battleship (not necessarily the present day battleship) will not be rendered obsolete at least until aircraft are capable of flying approximately three thousand miles with a heavy pay load, and returning without refueling, and that probably the battleship will not be obsolete as long as vessels continue to ply the surface of the sea. Hence the following article in reply to Cy Caldwell's article in the July issue of AERO DIGEST *entitled "The Battleship Bubble."*
—Author's Note.

IN the above article, Mr. Caldwell has barred, in any reply at the present time, any comments on the Airplane vs. Battleship question in its general aspects, without which, of course, no complete argument for the battleship can be advanced and no final conclusion can be reached. In fact, comment appears to be limited at this time to the "ability or inability of a battleship to remain afloat under attack". I therefore accept this condition and will adhere to it except in so far as the author himself does not appear to follow his text or where it may be necessary to bring forth facts bearing directly on statements made or quoted by the author.

In the first place let us consider the text, "the ability or inability of a battleship to remain afloat under attack". The question is, of course, entirely abstract and relative. Any conclusion reached depends entirely upon the conditions imposed, for any vessel can be sunk provided enough destructive force is exerted or allowed to be exerted against it. The actual conditions imposed by the author in his text fall into two classes which must be very carefully differentiated: first, the conditions of test bombing where obsolete, unprotected and anchored vessels were bombed from low altitudes and, second, the conditions of actual battle during the great war. Reserving discussion of the first condition, it appears that the second condition is a very logical condition on which to base conclusions. Under these conditions battleships have been sunk by gunfire and torpedoes, but a far greater number have remained afloat with their offensive and defensive power unharmed. As referred to by the author air bombs were, unfortunately for the purpose of this discussion, not used in fleet action during the late war. The question to be determined, therefore, appears to be *the ability or inability of a battleship to remain afloat under attack under the most modern conditions of warfare*, i. e., with the addition of the airplane bomb as one more weapon of destruction to guard against. This is unquestionably the trend of the author's discussion as exemplified in the following italicized quotation on page 34, "It conclusively proved the ability of aircraft to destroy ships of all classes on the surface of the water." It appears that the latter would be a more accurate text of the purpose of the article.

Mr. Caldwell in several places in his article also conveys the impression that Naval officers as a whole do not concur in the ability of aircraft to destroy ships of all classes on the surface of the water. Nothing could be further from the truth. There is no question, and never was any question, in the mind of the vast majority of Naval officers as to the truth of the above statement. What Naval officers have objected to, in this attack on the battleship, is the repeated claim that battleships can *readily* be destroyed by aircraft under battle conditions, based almost entirely upon the fact that several obsolete and defenseless battleships have been sunk by bombs under the most disadvantageous conditions which could be imposed upon them, and disregarding entirely direct evidence on the other side of the case. Hence the deduction that the battleship is obsolete. The author in his present article does not get directly down to the obsolete part of the claim, leaving that largely to inference and presumably to future discussion, but he does produce more or less the same evidence to indicate that the battleships can readily be destroyed by aircraft under the most modern conditions of warfare.

Therefore let us consider the evidence which Mr. Caldwell sets forth in his present article.

He first quotes certain paragraphs from "Armaments and the Non Combatant", by Mr. E. F. Spanner, of the Royal Corps of Naval Constructors, (retired). The facts set forth in the quotations from Mr. Spanner are well known to every naval officer and to any one who knows anything about ships. As here interpreted, however, Mr. Caldwell appears to be attempting to convey the impression that the officers of the U. S. Navy, as a whole, do not know even the first principles of their profession. For instance, "Mr. E. F. Spanner, a recognized authority on naval construction, has put this and other naval matters so clearly, that his book, 'Armaments and the Non Combatant', should be in the hands of every head of a bureau in the United States Navy. It also would make a very useful text book for the Naval Academy." It should be noted that Great Britain has made no move to scrap their battleships.

Now a few remarks as to the bombing of the *Ostfriesland*. It is unfortunate that, in his discussion of this event, Mr. Caldwell depends entirely upon quotations from General Mitchell. In a controversy of this nature, it is extremely important that conclusions should be based on a consideration of all the facts, and not on the opinions of one man. The official reports on this experiment, including the conclusions of the joint Army and Navy Board which witnessed the bombing test and which was signed by General Pershing, are available to Mr. Caldwell or anyone else who is desirous of reading the actual facts in the case. Without going into detail, the following are a few of the facts not mentioned in Mr. Caldwell's article but which have been set forth so often that it should really be unnecessary to repeat them.

(1) The *Ostfriesland*, laid down in 1909, was not a modern ship in any respect. At the midship section this vessel had only three skins, and over a considerable area, only two skins between the water and the vital inside compartments. The *Royal Sovereign*, a midship section of which is shown in Mr. Caldwell's article, was laid down in 1914 and had five skins at this section. The latest battleships afloat have six or seven skins, including armored and specially designed bulkheads; also greatly increased deck protection against bombs.

(2) The *Ostfriesland* was already leaking badly before bombing started, having taken on 1,020 tons of water on the trip from New York. Many water tight doors were missing or out of order, and battle-covers to airports near the water line were missing.

(3) The ship had no crew aboard to stop leaks and had no pumps to keep water clear.

(4) The ship was anchored and defenseless against attack. There was no anti-aircraft defense and *no defending airplanes* to keep off or distract the enemy.

(5) The bombing was done from altitudes all below 2,000 feet. whereas with modern anti-aircraft guns bombing would be extremely dangerous below 8,000 feet. Accuracy of bombing at 8,000 feet is only $\frac{1}{16}$ of what it would be at 2,000 feet.

(6) In the first day's bombing 52 bombs of from 230—660 pounds were dropped. There were 13 hits and several near hits. There was little damage above the protective deck and none below from direct hits. During the night 3,000 tons more water leaked in, partly from original leaks and partly from damage below the water line aft, causing a drag of two or three feet by the stern, and bringing the water line to within one or two feet of the unprotected

(*Continued on page* 682)

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AIRPLANE TIRES

Continued from page 680)

ports aft. This condition could easily have been prevented with pumps operating and a crew aboard to stop leaks.

(7) In the morning of the second day eleven 1000-pound bombs were dropped. There were three hits, none of which caused damage below the protective deck or to vitals. By noon the ship was five feet down by the stern from leaks and damage below the water line. In the afternoon of the same day six 2000-pound bombs were dropped. There were no hits but three exploded close alongside and sank the vessel, largely due to cumulative effect of bombing over a period of 23 hours.

At this point please note on page 34 of Mr. Caldwell's article the quotation from General Mitchell to the effect that after the 1000-pound bombing "that night she listed so badly that 2,000 tons of water were let in on the other side to keep her straight up so that she would not roll over".

I believe that this statement contains three errors of fact: (1) no night intervened between the 1000-pound and 2000-pound bombing; (2) no water was admitted to correct a list, and (3) there was no important list, that is, more than 3 or 4 degrees. The vessel was down by the stern as previously stated.

Also please note the quotation from General Mitchell on the same page to the effect that the first smaller bombs "injured the ship so severely that if she had been equipped with ammunition and had had steam in her boilers, she probably would have been destroyed". This quotation has only one saving grace—the word "probably". The evidence of the *Ostfriesland* tests, as previously stated, is directly contrary to the above statement. The vitals of the ship—the ammunition spaces, turrets, boilers, engines, etc., were not touched by any of the bombs. She was sunk by loss of buoyancy alone.

It can be safely stated that even this obsolete vessel could not have sunk as the result of this bombing if she had been manned and pumps working—even if she could have been hit as readily and often in battle, being, as she was, the lone and unprotected target of 69 bombs.

The principal fact proved by the sinking of the Ostfriesland was that bombs exploding in the water close to the hull do far more damage to a vessel than do direct hits. The former may effect buoyancy, stability, and speed, whereas the latter are localized in their effects.

It might be mentioned at this point that at the present time there are but two really modern battleships afloat (these belong to Great Britain), since, under the terms of the Limitation of Armament Treaty, only that number has been laid down since 1921, and no more will be laid down before 1931. Hence the battleship is now laboring under a ten-year handicap, as compared with the development of aircraft, although present battleships are being modernized in resistance to torpedo and bombing attack as far and as fast as possible. The antagonists of the battleship seem to have overlooked the above fact, and the possibilities of far greater protection against bombs and torpedoes in the battleships which will be laid down within three or four years if there is no extension to the Treaty mentioned.

Returning to Mr. Caldwell's article, on page 35 he goes into some detail as to the sinking of the *Queen Mary* and the serious damage to the *Lion* by gunfire as a proof of the damage that direct bomb hits can inflict. He entirely neglects the following facts of which he is probably unaware:

(1) That the destructive action of shells is *not* considerably less than that of large bombs—even 2000-pound bombs. A 2000-pound bomb dropped from 10,000 feet has only one-fourth of the energy that a 16-inch shell (weight 2,100 pounds) has at a range of 20,000 yards, or one-third of that at 30,000 yards. Although the standard 2000-pound bomb contains many times more explosive than the 16-inch armor piercing shell, it has practically no penetrative ability, whereas *the shell can penetrate a considerable thickness of armor and take its explosive to the vitals of the ship,* even at long ranges. In other words the amount of explosive in the thin shelled bomb is of little assistance in getting through armor. The greatest destructive effect of a bomb which is detonated before it pierces armor is sideways and upwards. Even if we consider the latest 2000-pound armor piercing bomb, designed more like a shell, i. e., with a heavier case and less explosive, in fact similar to a thin walled high explosive shell, the advantage is still greatly in favor of the shell, on account of its greater kinetic energy at the point of impact. Finally, therefore, a bomb has little chance of taking its explosive charge through the thicknesses of protective deck on our modern battleships, and now being installed on our older battleships during modernization, unless the bomb is dropped from such a height that the chances of hitting are practically nil. If bombs had been dropped on the *Queen Mary* and *Lion* in relatively the same positions as the shell fire referred to, they could not possibly have had the penetrative, or destructive effect of the shell fire referred to.

(2) The *Queen Mary, Lion* and other British battleships had defects in the armor protection of their turret ammunition supply and also defects in the safety door protection of their ammunition hoists against fires in the turret, which were readily recognizable after these disasters. The same defects did not exist on German battleships and do not exist on American battleships. It may be noted that in the Battle of Jutland several of the latest German battleships were hit as hard as the *Queen Mary* and *Lion* in approximately the same place, but none of them "blew up" in the manner described.

Mr. Caldwell then goes on to prove by the case of the *Lutzow* that "bulkheads afford no certain protection". Of course they don't, and no one ever contended that they do. Any form of protection is only relative. There is nothing which will afford any war craft certain protection against destruction from aircraft, or from surface craft. Aircraft attack is but one more weapon of destruction to be guarded against.

Next the subject article goes on to "suggest that a battleship need not necessarily be sent immediately to the bottom by such a weapon as an aircraft bomb in order to insure its actual destruction". This, of course, is also undoubtedly true—and always has been recognized as true as applied to gun and torpedo attack, as in the cases of the *Ocean* and *Irresistible* referred to. In other words, aircraft attack gives rise to no new condition in this respect—as stated before, it is but one more weapon of destruction to be guarded against.

Then the author discusses the destructive effect of large bombs exploding in the water close to the hull and the size of the hole likely to be made. The cases he cites are not exaggerated but his conclusions as to the probable effect on a modern ship are not based on known evidence. The results from the bombing of the *Marlborough,* laid down in 1912, and the poor old *Alabama,* laid down in 1896, long before airplanes ever flew and when even torpedoes were in their infancy, are hardly likely to be an indication of the relative damage that would be done to a modern ship.

Now, having commented on all the evidence which Mr. Caldwell sets forth in his present article, let us consider some evidence on the battleship side of the case which he has entirely neglected to mention, that is, the direct evidence as to the effect of bombs on the underbody of a fairly modern ship, as shown in the tests on the *Washington.* These tests have been the subject of a considerable amount of vituperative comment on the part of General Mitchell and others, either from lack of knowledge of the object of the tests, or in a downright attempt to deceive their readers and listeners. It is perfectly true that, as claimed by these antagonists, no bombs were actually dropped on this vessel (not even sand bombs as stated by General Mitchell), for the following reasons:

First—the *Washington* was far from being completed. All watertight subdivisions were completed up to the third deck (five feet above the water line) but this deck and the upper decks were not complete, were not riveted down over a considerable area, and the vital compartments of the ship, the boiler and engine rooms, were entirely open and unprotected from the air. It would therefore have been futile to expect this vessel to resist any bombs from the air or to get any information from such a test. Moreover, fairly reliable information as to the actual effects of direct hits had already been obtained on the *Ostfriesland.*

Second—the object of these tests was to obtain accurate information as to the effect of bomb and torpedo charges exploded in the water alongside the vessel at *predetermined distances and depths.* It would manifestly be impossible to obtain such data from the explosions of bombs dropped from the air.

A general description of the tests and results follows:

As to protection against external explosions, the *Washington* had at the midship section six skins between the water and the vital machinery spaces at the side and but

(*Continued on page 686*)

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STILL THE SAME OLD BUBBLE TO ME

(A reply to Commander W. W. Webster)

By Cy Caldwell

COMMANDER WEBSTER'S excellent article on the preceding pages is very welcome in AERO DIGEST. As I wrote in my first article on the battleship, in the July issue: "The Navy adheres to the belief that the backbone of the fleet is the battleship. That belief I consider fallacious. . . If I am wrong I want to know it; while if the Navy is wrong, they should know it. And the taxpayers should know it." My article and Commander Webster's reply open for frank discussion the involved question of the airplane versus the battleship, with the hope on my part that the people of the United States (who are paying for both of these weapons) may arrive at some conclusion regarding their relative merits as weapons of defense.

In his opening paragraph Commander Webster states that: "he feels safe in predicting that the battleship (not necessarily the present day battleship) will not be rendered obsolete at least until aircraft are capable of *flying approximately three thousand miles with a heavy pay load, and returning without refueling.*" This statement shows that Commander Webster apparently has deduced from my first article that I would do away with the Navy and leave the defense of the country and its island possessions in the Pacific solely to aircraft. This is either a misconception of my article on Commander Webster's part, or a misconception of his statement on my part. I intended to give no such impression. The Navy is as necessary today as it was thirty years ago; in fact, *it is more necessary today.* But it must be a *modern* Navy, with the maximum of mobility and hitting power at long ranges. And that maximum it never can achieve so long as it persists in regarding the battleship as the backbone of the fleet. So I state here that I find fault, not with the Navy, but with the Navy's reliance on a weapon that I consider obsolete—the battleship itself. Therefore there is no question of airplanes having to fly return journeys of 3,000 miles with heavy loads; aircraft in a modern Navy will depend upon sea-going vessels for transport, and sea-going vessels will depend upon aircraft for protection against other aircraft and against other ships, with only subsidiary protection from their own armament. I did not mention this in my first article, for it had no bearing upon the subject of the article; and I mention it now only to clear up a misunderstanding. It is my conviction that *present-day aircraft,* with no thought of their eventual development, may, *with the help of a modern and properly-balanced Navy,* defeat with ease any Navy depending upon the obsolete battleship as the backbone of the fleet, and using aircraft only as an auxiliary.

With this brief explanation of my position, I may consider Commander Webster's reply to my charge that the battleship will be unable to remain afloat under attack under the most modern conditions of warfare i. e., with the addition of the airplane bomb as one more weapon of destruction to guard against. In the first place, the reader should realize that both Commander Webster and I are discussing this question at a disadvantage. As he says: "Air bombs were, unfortunately for the purpose of this discussion, not used in fleet action during the late war." The best that either of us can do is to note the destructive effect of shells, torpedoes, and mines in the late war; and from that information to draw conclusions as to the destructive effect of air bombs and torpedoes used against battleships in the next war. This I have endeavored to do in my article, and Commander Webster endeavors to refute my conclusions by a comparison of the destructive effect of shells and bombs. He says: "Returning to Mr. Caldwell's article . . . , he entirely neglects the following facts of which he is probably unaware: That the destructive action of shells is *not* considerably less than that of large bombs—even 2000-pound bombs. A 2090-pound bomb has only one-fourth of the energy of a 16-inch shell . . . . it has practically no penetrative ability, whereas the shell can . . . . take its explosive to the vitals of the ship." Also: "The advantage is still greatly in favor of the shell on account of its greater kinetic energy at the point of impact. If bombs had been dropped on the *Queen Mary* and *Lion* in relatively the same positions referred to, they could not possibly have had the penetrative effect of the shell fire referred to."

I grant readily the truth of Commander Webster's statements of the relative effect of shells and bombs in *penetrative* power, but not in *destructive* power. For instance, I doubt if a 2000-pound bomb would *penetrate* a gun turret; but I do believe that the effect of it, if dropped beside a turret, would be to overturn the turret or at least jam it so that it could not be revolved—in which event all of the guns in that turret would be rendered inoperative. As to the bombs that would drop in the water in proximity to the battleship, there was no suggestion in my article that the bombs would have to penetrate armor. They would not have to. Their action would be from below, on the thin steel skin of the ship and on the inner subdivisions. However, Commander Webster was justified in making this point, for in my article I stressed the damage done by shells on the superstructure. But I stressed that damage only because it revealed the vulnerability of the battleship to the weapons of ten years ago—which still are considered by the Navy to be the main weapons of today. And Commander Webster's assurance that the defects that existed in the *Queen Mary* and the *Lion* do not exist in American battleships does not assure me that American battleships may not be sent to the bottom by aircraft bombs, exploding alongside the ship. And as for those that explode on the ship, is it seriously suggested that the effect of a 2000-pound bomb, dropped on the bridge of a battleship would be less than that of a shell? Considering in its broader aspects the relative effect of bomb and shell on and around the whole ship (and not on one certain point), I cannot see why I should change my opinion that the action of big shells is considerably less than that of large bombs.

But this is an important point and deserves study. The only excuse for the battleship's existence is that it should serve as a platform from which large guns may be fired—its heavy armor is carried merely to insure that it remains afloat for that purpose. And if the destructive power of shells is much less than the destructive power of bombs, there is no longer reason why battleships should be built to carry around these comparatively ineffective weapons. Now, this article does not pretend to go into detail regarding shells and bombs and their relative powers of destruction. But ships have been sent to the bottom by both means, and, as we are discussing here the vulnerability of the battleship to air attack, it is pertinent to discuss the means by which warships were sunk or damaged by shells, mines, and torpedoes in the 1914-1918 war, in order that we may arrive at some conclusion as to the probable damage that will be inflicted by air bombs in the next war—for the action of a mine or torpedo and of a bomb dropped from the air is not radically different. In fact, if the explosion of the air bomb is directly against the side of the ship, the effect, pound for pound of explosive, is identical.

In the Battle of Jutland, the only major engagement in the late war where battleships figured on both sides, British capital ships fired 4,598 shells of large size—and only 100 hits were made—an average of 2.2 per cent. The Germans fired 3,597 shells, making 120 hits, or 3.3 per cent, excluding the three British battle cruisers sunk, on which hits could not be estimated accurately. The total weight of metal and explosive fired by both fleets was about 9,000,000 pounds—and not a battleship was sunk on either side! These were shells, and Commander Webster states: "The destructive action of shells is *not* considerably less than that of large bombs."

Let us see what the little brother of the large bomb did in the last war—I refer to the mine and the torpedo, working against the thin under-water hulls of the ships. The British battleship *Audacious* was sunk in October, 1914, by striking a mine off the Irish coast and several pre-dreadnought battleships and cruisers were lost from this method. (I referred to some in my previous article.) The French 18,000-ton battleship *Danton* was sunk by a submarine torpedo in March, 1917, in the Mediterranean; while three older battleships and several large armored cruisers were sunk by mines or submarine's torpedoes. The Austrians lost the 20,000-ton *Szent Istvan* and the *Prinz Eugen* in June, 1918, in the Adriatic Sea; and the *Viribus Unitis,* a sister ship was

(*Continued on page 686*)

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(*Continued from page* 682)

two skins in the bottom inboard. None of these skins was heavier than ¾-inch mild steelplate.

Five bombs were exploded; three of these were special 2000-pound bombs with 1,000 pounds of high explosive each, equivalent in explosive force to a 2000-pound air bomb, and two had 400 pounds of high explosive equivalent to a torpedo. The three 2000-pound bombs were exploded at the most effective depth and at varying distances from the hull within the zone where it was claimed that similar explosives would destroy the ship. The two 400-pound charges were exploded right up against the skin of the ship.

As a result of these tests holes of considerable size were blown in the outer skin, the largest being about as large as those described on page 182 of the AERO DIGEST article, and yet the second skin and inner bottom of the ship were in no place ruptured. The maximum depth of any flooding through the side was past the fourth skin and that was in only one spot. There was a small leak in one boiler room, through the double bottom and in the outboard bulkhead. The maximum list of the ship during or after the tests was 5 degrees. The leaks and small list could have easily been stopped by a crew even without pumps. There was no damage to boilers and condensers, the only machinery in the machinery spaces. The ship in commission would have been able to remain in the battleline at reduced speed and would have had no trouble in making port under her own steam. After these tests the members of the Board were able to go into the inner bottom of the ship.

Later one 14-inch shell was dropped on the armored deck from 4,000 feet to test the possible penetrative effect of a heavy case armor piercing bomb (not then in existence). The shell did not penetrate the deck, but the results indicated that it probably would have if dropped from a much greater height, and it was therefore concluded that armored decks should be heavier.

After the above tests the ship rode out a gale for three days without any repairs, and was finally sunk by fourteen hits of 14-inch shell fire, fired at a very oblique angle. The ship sank 2-¾ hours after the guns opened fire.

In conclusion, therefore, it appears that the weight of all the facts and evidence available support the following conclusions as to the subject matter of this article:

(1) The ability or inability of a battleship to remain afloat under attack depends entirely upon the amount of destructive force which can be exerted against it under battle conditions.

(2) There is no question as to the ability of aircraft to destroy ships of all classes on the surface of the water (as they can also be destroyed by gunfire and torpedoes), provided enough destructive force can be exerted against them under battle conditions.

(3) The destruction of obsolete and unprotected battleships by a number of bombs, under the conditions which obtained in these tests, does not prove either that modern battleships can readily be hit, or if hit that they can readily be disabled or destroyed by aircraft under battle conditions, (except possibly when the air force of one side is so preponderant *at the point of action* as to give that side practical control of the air).

(4) In fact the available evidence more definitely indicates that a modern battleship under battle conditions has a reasonable chance of remaining in action even if hit or nearly hit several times by bombs.

(5) Of course, the chances of battleships being sunk or put out of action is definitely increased by the addition of another weapon of destruction, i. e., the air bomb, and the possible cumulative effect of shell, torpedo and bomb attack.

(6) The arguments, to determine whether these chances render the battleship obsolete, taking into consideration all other phases of the question, must be left to a later article or articles.

(*Continued from page* 684)

sunk in Pola by an Italian motor boat. In all, *five* modern battleships were lost by the warring navies by mine or torpedo, *which is exactly five more than were sunk by shell fire.* Yet Commander Webster states: "The destructive action of shells is *not* considerably less than that of bombs." Then how account for the loss of these five battleships by mines and torpedoes, whose action on the under-water hulls of ships is practically the same, pound for pound of explosive, as that of aerial bombs?

Shells in the world war accounted only for the lighter type of vessels, battle cruisers, armored cruisers, destroyers, and other craft, while the mine and torpedo sent five splendid battleships to the bottom. How many will air bombs send to the bottom in the next war?

As evidence of a modern battleship's ability to remain afloat under air attack Commander Webster cites the tests on the *Washington,* but I fail to find in those tests any assurance of invulnerability with which the crew of such a ship could comfort themselves in war. Again in this matter we are discussing at a disadvantage. The ship was not complete, it was not in motion, it was not defending itself, no bombs were dropped on it or around it; in short, no effort was made or probably could be made to simulate war conditions. The hull lay in the water, while various charges of explosive were detonated at selected points along the hull. And note that I say "selected points". The damage was not all on one side, not all on one end. The explosives were so placed that the ship would fill gradually and sink on an even keel—a condition that no enemy dropping bombs from the air could be expected to produce. "The maximum list of the ship during or after the test was 5 degrees." If the ship had been in action it might have received damage that would cause a much greater list—a matter that I have already discussed in the July issue of AERO DIGEST, where also I have mentioned the fact that the fate of a damaged battleship would not be long in doubt were it to fall out of line. Commander Webster says: "The ship in commission would have been able to remain in the battleline *at reduced speed* and would have had no trouble in making port under her own steam." If the enemy would allow her to do so—he might have added. But here is a frank admission from Commander Webster that the *Washington* could only have remained in the line at reduced speed—which obviously would have reduced the speed of the whole squadron. And the *Washington,* please note, is the most modern hull yet constructed for the American Navy. What is Commander Webster's opinion of the ability of older hulls to withstand damage from aerial bombs? After all, the Navy cannot fight a war in the *Washington,* which is now at the bottom of the sea; and it cannot fight only in some battleships that may be constructed in the future. It must fight in what it has got, and sink with it or swim away from it.

Likewise Commander Webster draws consolation from the fact that the *Ostfriesland* and the *Royal Sovereign,* cited by me, were not of the latest design. Quite true; but neither are the majority of the ships in *any* Navy of the latest design. They cannot be. A battleship, costing up to forty millions of dollars, is expected to last for some time—at least until the next war gets under way. Commander Webster states: "It might be mentioned at this point that at the present time there are but two really modern battleships afloat (these belong to Great Britain)." According to this, if an American sailor desires to fight a *modern* war in a *modern* battleship he must join the British Navy. I mention this point merely to stress the fact that when battleship enthusiasts speak of how *modern* battleships can withstand damage they are speaking of what does not exist in the United States, and only two costly specimens of which exist in England! The reader will note that the majority of the sailors in any war are fighting in ships of all ages up to thirty years. And the fact that the crew of the British *Rodney* may have some confidence in their ship is of but little comfort to the crew of the old *Oklahoma.* So when Commander Webster speaks of obsolete vessels he is, by his own definition, referring to the whole line of American battleships—which leaves us absolutely in accord.

In conclusion I wish to express my appreciation of Commander Webster's spirited defense of the battleship, and also to express the hope that he will reply to other articles by me as they may appear. As I stated in the August issue of AERO DIGEST, I make no pretense of being an "expert" on this question of the battleship versus the airplane, nor do I put forward opinions with any thought that they may be the last word on the subject. I approach the whole question from the point of view of the layman—who, after all, is paying for the show—and as a layman, after some little study of the matter, I am convinced that the time has arrived for a careful survey of the battleship's position in the scheme of National

(*Continued on page* 828)



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PERSONAIRLITIES



by Caldwell

THIS is being written away up in the Northern end of Wisconsin at a place called Superior—probably by some cynic with a perverted sense of humor. Its a small city on the thin end of Lake Superior, the place where they raise the famous Whitefish. Also, it is the Summer Capital of this great nation. But as they didn't ship any Congressmen or Senators up here, the town is getting off pretty lucky, at that. The President comes in twice a week from his camp on the Brule, when the citizens and visitors take a good long stare at him, and then stand around until he comes back again. There isn't a great deal for a visitor to do in between times except to go and look at the huge ore docks. But you can only look at an ore dock for so long, when it begins to go stale on you. These docks here have quite lost their charm for me, and I'm back at the hotel, on a foggy, rainy day, trying to scare up enough energy to write. There are four other discouraged visitors here—reporters from the outside world. They interview the President every week. That is, they ask him questions and he doesn't answer them. These interviews consist of a big flock of earnest questions, followed by an even bigger flock of dignified silence—and then the writing quartette files silently out, trying not to look foolish. These reporters are supposed to be political experts sizing up National Affairs; but so far as I can see they're doing the same work as the cub who visits Fulton market in New York each morning to get the fish news. They report to their papers the number of fish Cal has collected each day—and the report appears in the paper next to the daily quotations on green cod and halibut. Incidentally, judging by the empties outside their door this morning, these reporters are all good Smith men.

I only got in here yesterday, and with the assistance of a Fairchild and a Wright Whirlwind I'll be going out to-morrow, but after just a few looks here and there I've concluded that before President Coolidge decided to come here he must have been very fed up with Washington. I know I wouldn't be here if I didn't have to be. In fact, this is one of those places where a Gideon Bible actually has some chance of being read by desperate hotel dwellers. I was just about to turn to the Book for a bit of comfort, myself, when in came Second Lieutenant Lee Duncan of the Air Corps, who is up here flying the President's mail. He is now parked in a chair while I give him the third degree for the benefit of this column and the stimulation of my six faithful readers, who read me month after month, hoping against hope that I'll say something useful.

This Lee is a mere infant, born in 1904, in which year I was experimenting with the old man's pipe and snitching the odd bottle of beer from the family refrigerator. That was shortly after I had learned to walk. In fact, I learned to walk very quickly, because the refrigerator was quite a distance from my nursery. I used to walk out and crawl back. What a child I was, to be sure! But we were speaking of Lee. I'm sorry I haven't a picture of him, because he's a very fine-looking young man—and I'd like at least one good picture on this page. I don't know why it is, but pilots as a rule are a homely lot. You take and print a picture of birds like Casey Jones or Caperton or myself, and it's really discouraging. And right here let me congratulate those pilots who have sent me their pictures—they're honest men who are willing to admit the worst about themselves. I only wish George Wies would send me a picture of himself in a bathing suit—I'd print it the whole length of this page, but I'd only need to use a half inch sideways. Or a picture of George curled up inside a Monocoupe would be a snappy exhibit—"A Study in Angles" I'd caption it. To watch George getting in that little cabin and wrapping his feet and legs around what Arthur Starbuck, I believe, would refer to as an Evinrude motor, is a joy to a tired soul like me. I find so little to chuckle over in this drab world. And George went and got married the other day, and I never heard where that helped a man's sense of humor. About the only thing George can do now is to become a philosopher like the rest of us. It always saddens me to see a good bachelor go down to defeat—let's get back to Lee, who still has life ahead of him, if the Army keeps moving him fast enough.

And that's the point—to keep moving. This Lee collects a girl in each town he visits, and he's just about gone when the Army moves him to a new place. And just as he's got to the point of proposing, they save him again, and he starts all over in a new town. If they ever make a mistake and send him back to a place, he'll be gone, sure. And now for a brief history of this engaging youth. For 22 years he kept both feet firmly planted on the ground, when all of a sudden he lost control of himself and crashed into the Air Corps as a cadet—which is a sort of military Boy Scout. Amazed and delighted at Lee's decision to become a martyr for the good of his country, the Army promptly posted him to Brooks Field, San Antonio, Texas—the Winter Playground of America (if you enjoy playing in the rain). Here the dear old Army proceeded to hand this lad the works, finishing him off with a sigh of relief in March, 1927, at Kelly Field. He was by that time completely full of aeronautical lore, and not another drop could have been forced into him with an Alemite grease gun.

Lee spent four months gazing in rapture at his new wings, and then was posted to Fort Riley, Kansas—the Army informing him, with characteristic misuse of words, that he was "on active duty". Just how anyone could be very active in Fort Riley, they didn't explain. But Lee put his own interpretation on the words and engaged in his usual activities. And judging from her picture which he keeps framed on his bureau, he's a young man of excellent taste, and no slouch at finding his way about. (Just a word of warning to a sweet little girl from a very old man who has advised hundreds: When I was young and chipper myself I also had one of those hand-hammered silver frames. And you'd cry your eyes out, young lady, if you knew how often I used to change the picture in it.)

Incidentally, Lee does a bit of flying for the Army in his spare time—quite a bit. Last summer, during daylight, he carried President Coolidge's mail from Rapid City, South Dakota, to North Platte, Nebraska. This summer, during the day, when he isn't busy, he is again carrying the President's mail from Superior to Chicago. Next year he'll be acting as Postman for Smith or Hoover. So that's the sad story of an earnest young Boy Scout who started out to defend his country and ended up by toting a flock of mail bags.

SPEAKING of this Presidential air mail, they ought to pass a law forcing a President to take his vacation in a place where the mail plane has a chance of landing if the engine ceases fire. On this run from Chicago to Superior, over which I flew yesterday (and over which I regret to say that I shall have to fly to-morrow), there's little to land on for the first 150 miles out of here except scrub spruce—and I hate getting scratched up by scrub spruce. Any time one of these Army planes lands in that region, they just load it in a box-car and send it back to Fairfield to have it joined together again. They've shipped four back so far, and the boys down in Fairfield report that they are running out of glue. Only birds too old and tough to be scratched by anything less than a file should be posted to this run. I could name off-hand three or four generals and a whole herd of admirals who should be carrying mail over this territory. It would serve them right to have to fly the mail, and then sit down and pick pine needles out of themselves.

And say, you ought to see the flying field the boys are using here. I know it's only temporary—but so is life! This thought

(*Continued on next page*)



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(*Continued from preceding page*)

may have occurred to Lieut. J. H. Atkinson when he flopped a Douglas over on its back while he was trying to take off from a sea of mud. The field, by the way, is right beside the County Insane Asylum and Poor Farm. Pilots who stay on this run long enough may qualify for either. Lieut. C. T. Skow is in charge of this bold detail, while the piloting is done by Lieutenants Atkinson, Duncan, Broughton, and Purtle. These officers have done good work this summer, in return for which they will undoubtedly be made generals after all the infantry and cavalry have died off.

But as I said, Presidents shouldn't go so far away for vacations. One solution is to nominate and elect Mayor Walker of New York. Then an ordinary postman could bring the mail direct to the night club.

WHAT have we here, folks? Name it and take it away. It's the famous hump-backed Hoopo of Pine Bluff, Arkansas. The smiling gentleman in the rear seat, who is in the very act of bumping his head on the window-casing, is Pilot Allen Scott of the Arkansas Power and Light Co. He patrols the power lines to guard against Arkansas citizens taking up the poles to use as tooth-picks—they're a big strong bunch of he-men down that-away. Scott tells me that this little ship, the Hoopo, is 10 miles an hour faster than it was before he forced it to take that cabin, and that it has outrun every ship he has raced against. (I suppose it is scared of itself—I know I would be if I ever got in a shape like that.)

Allen has been flying for five years, and is only 21 now. He flew this Hoopo during the flood in Arkansas, Mississippi, and Louisiana, carrying out-board motors, food, and supplies to the flooded areas. Also, in addition to patrolling the power lines, he carries passengers and operates a school. And you can see for yourself that an airplane has no chance with him at all. If you ever find that place on the map and fly down there, keep an eye on your plane, or Allen will change its shape in the twinkling of a whisker.

Pine Bluff is up-and-coming: a 105-acre field, three hangars, five ships, gas, oil and water (and bring your own corn to mix with it). They're going to build a club house with a café, rooms for visiting pilots, radio, bowling alley, billiard tables, and a place on the floor to shoot crap. (Bring your own galloping dominoes.)

HERE'S Dick Allen, who flies a Stinson for the A. W. Shaw Co., publishers of *The Magazine of Business,* Chicago, who publish each month in their magazine a complete log of the ship, with all operating costs. Russell L. Putman, vice-president of the company, uses the ship in his every-day work in connection with the Shaw publications. In six months Dick flew 21,907 miles, stopping at most of the larger cities of the Middle West, East to New York, South to Florida, and everything in between. Dick is the right Bird to be flying for this Magazine of Business. Did you ever see a more business-looking pilot in your life? He looks as though he was about to put over a big deal, or sock a guy in the eye, or something. But I know him, and he isn't half as tough as he looks. He couldn't be.



Dick Allen

LIEUTENANT ERIC NELSON, of the Army Round-the-World flyers, has resigned from the Army Air Corps to take an engineering position with the Boeing Airplane Co., of Seattle. Nelson left because he figured he'd be an old man with two complete new sets, both uppers and lowers, before he could be promoted to a captaincy. You see, he has only been a commissioned officer for ten years, flew the New York to Nome flight in 1920, the San Antonio-Porto Rico-Washington flight in 1923, and the Round-the-World flight in 1924. He received the Distinguished Service Medal from Congress, the Legion of Honor from France, and the Royal Order of the Sword from Sweden. Why he should think he is entitled to be promoted to captain on that record is more than I can figure out. So long as there are Army officers ahead of him on the promotion list—men who have had experience with mules and cavalry horses and sand-bags around Washington—I don't see why this man Nelson should not be content to remain a First Lieutenant all his life, or at least until all the mule-handlers and quartermasters have died of old age. I suppose all the running around he did sort of unsettled him for the quiet Army life—I really can't explain his resignation any other way. Captain Lowell H. Smith is the only one of that World flight still in the Army. I do hope he doesn't get hankering to be a Major—it would be *too* annoying to lose all of that World crew.



Lt. Eric Nelson

MY old friend Mac of Curtiss, known to the police of Garden City as William H. McMullen, has been flying Curtiss Hawks and Falcons through South America during the past year. With Lieut. Jimmy Doolittle of the Army Air Corps he has been flying for the Curtiss Aeroplane Export Corp., of which that real old-timer, Clifford W. Webster, is president. Mac doesn't say so, but I gather that Jimmy brings out all the wilder characteristics of the Hawk, while Mac carries the mechanics and the baggage in the Falcon. If Jimmy Doolittle is around, there isn't much use in anyone else trying to act up in a Hawk—they might just as well sit down and bet on which side or end of the ship will be pointed toward them.

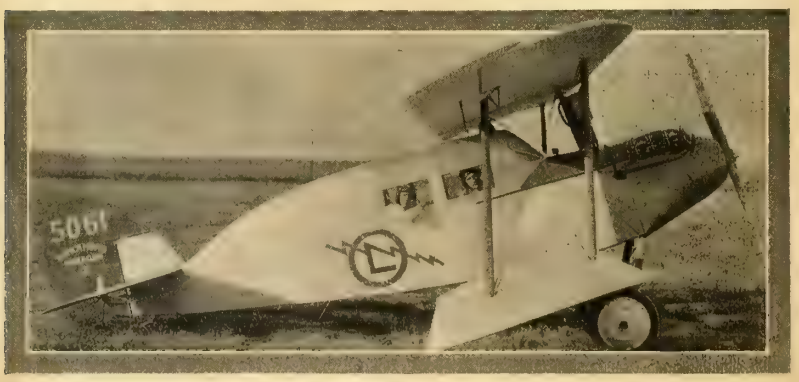


Lt. Jimmy Doolittle

These boys have flown from Lima, Peru to La Paz, Bolivia; from La Paz to Santiago, Chile, to Buenos Aires, Rio de Janeiro, Tortilla, Manana, Frijoles, Hidalgo, and Panatella de Mozo. Anything that was on the map they have been at, over, or near. Some of the towns Mac mentions aren't on any map. Where, for instance, are these places that he mentions: Cerveza? Ron Wisky? Old Crow? Haig & Haig? I can't find them. I wish I could.

W. G. McGeery, United States Department of Commerce representative at Sao Paulo, Brazil, sends the following translation of an article from a Brazilian paper. "A Yankee aviator who is traveling on our continent demonstrating his aeroplane has just landed unexpectedly in Rio de Janeiro. Where did you come from?' 'From Assumpcao.' 'What is your name?' 'James Doolittle.' Quietly he had taken off at 8:15 in the morning from the Paraguayan Capital and at 3:05 landed in Rio. He flew alone without advertising, as if it were the most natural thing in the world: he left As-

(*Continued on next page*)



The Hoopo of Pine Bluff. Allen Scott, pilot, in rear cockpit.



Your Future in the Air!

THE future of aviation is tremendous—is assured. *But what about YOUR future in it?*

What do you see in the skies for yourself? A career of thrilling work with big pay and a glorious future can be yours in the *world's fastest growing industry!*

Aviation has passed the stage where ordinary training methods mean anything. *Where* you are trained, and *how* you are trained, will determine your place in Aviation a year—two years—five years from now.

It costs you *no more* to receive your training at the world's *largest and most elaborately equipped civilian air school!* Parks Air College, nationally recognized, is weekly sending out graduates to *good* jobs in the industry. Parks-trained pilots are making $700 per month and *up!*

One organization alone has agreed to take 200 of our graduate pilots by spring!

The photos on this page give you just a *few* glimpses of Parks Air College. Located in St. Louis, the recognized center of aviation in America, Parks Air College has facilities and opportunities undreamed of until you see them with your own eyes.

Twenty-six licensed training planes; fifteen transport pilots, over $150,000 worth of training equipment; hangars, classrooms, restaurant, recreation hall, etc.—Parks is like a great university!

You get flying instruction *every day* on brand new training planes equipped with OX5 and Whirlwind engines, fitted with stick and wheel control—*thorough flying instruction that turns you out a real pilot ready for success.*

Thorough Training

At Parks Air College you are taught straight flying, acrobatics, forced landings, vertical banks, cross wind landings, cross country flying, recovery from spins, and other flight details, by nationally-known transport pilots.

And in addition to flying, a pilot must know aerial navigation, meteorology, aerodynamics; be familiar with such famous engines as Whirlwind, Caminez, OX5, Velie, Wasp, and others. You must know how to *take care of your own ship! All this is included at Parks Air College!*

No wonder students have come to Parks from every state in the Union and from Canada, Panama and South America! No wonder they are now coming from Honolulu, Europe, even Africa!

Special Offer Free

Our 24-page catalog, "Skyward Ho!" gives full details and all the facts about our college, about commercial aviation, and about our Pilot's Ground Course. It contains 46 actual photographic illustrations, so you *can see with your own eyes exactly how Parks excels.*

A copy will be sent free if you write at once, together with details of how you can save $155 on your tuition by enrolling within *the next 3 weeks!*

If *you* are serious about your future, wire for a copy of "Skyward Ho!" or send the coupon *Air Mail at once!*











All photographs taken on Parks Airport

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(*Continued from preceding page*)

sumpcao with the intention of dining with a friend in Rio de Janeiro—and he dined with him. We commend the quiet modesty of the North American aviators. They do not give notice as to when they will arrive; they arrive. Only when the job is done do they proclaim it."

The citizens of foreign countries derive their impressions of America and Americans from traveling Americans. And only too frequently those travellers are of the loud-mouthed tourist type. It must therefore be refreshing to the South Americans, as well as surprising, to encounter two quiet gentlemen of the air like Doolittle and McMullen. No wonder the amazed Spanish writer headed his article, "Batuta", which may be translated, "'Ata Boy!"

THE three lads standing before the brand new Waco Ten are Paul Nuicelle, Bill Grey, and Charles Ramsgate, who are in the passenger and instruction business at Sea Girt, New Jersey. They have two new Wacos and a copy of AERO DIGEST, so they ought to do well. Charlie Ramsgate is a Brooklyn attorney and flies for the fun of it.



Nuicelle, Grey and Ramsgate.

"SOMEBODY better build a boat or I'll have to build my own," writes Eddie Nirmaier of Miami. Eddie sold his two Seagulls to Henry Berliner of Washington—and within two weeks Henry's pilots had cracked them both. And although Eddie didn't own them any more, he felt bad just the same. He had used one of those planes for two years, and Bob Moore, I believe, had used the other.

COCK-EYED aeronautics in the land of Madame Butterfly, as reported by my old friend Pilot Bob Ward, late of Decatur, later of Tokio, and now in Manila, P. I. "Since June 1—two months—the slant-eyed boys have busted up over $2,500,000 worth of airplanes and lighter-than-air stuff, not counting the death rate as being worth much in cash. There's plenty left. I haven't a complete list, but here are some of the details: One blimp—some egg set fire to it with a lantern. About 8 dead. One other blimp—landed in water and busted—about 8 more dead. One seaplane—planted it on the beach. Only killed one. One other seaplane—they won't land on mountains. Four or five extra landplanes—strung out in the rice paddies, etc.—just killed a few. One nice 8-passenger job—the pilot pulled it up and forgot his sky hooks. It wouldn't float, so only killed 7, there being only 7 in. There are a few more but I can't remember everything."



The Sheriff and his Monocoupe.

I've got all over worrying about that aerial invasion of the Philippines that was on my mind some time back. I guess if they decide to move down there and stage a scrap that they'll have to go by boat, that's all. To date the Japanese haven't done anything in the air except hit the ground, but they're wizards on the water.

THE determined looking gent who uses helmet and goggles in a cabin plane is Sheriff-elect L. M. Hatton, Jr., of Tampa, Florida, who plans to chase crooks by air, after his election on January 1st. His slogan is, "When the sheriff flies, the crooks fly—back to jail". This sounds like a standard election promise to me. How are the sheriff and the crook both going to get inside that Monocoupe? That's what I want to know. This sheriff looks like a pretty beefy lad—and you can't expect all crooks to go on a diet just so the sheriff can take them to jail by air. Besides, how is the sheriff going to tell a crook from an ordinary politician, from up in the air? You can hardly tell some of them apart, on the ground. In fact, we had some in Washington that you couldn't tell apart—even the Grand Jury was baffled. No, this lad Hatton can promise that to the electorate of his district. But as for me, if I lived there, I'd vote for the man with a Chevrolet.



Mrs. Eddie Stinson, Phoebe Fairgrave Omlie, Mrs. Frank Hawks, Mrs. Bert Hull, beside "Chiggers", number 26 entry in the National Air Tour.

AND here we have four very charming ladies who flew all the way round on the National Air Tour, and who proved to be the very best of good fellows. Reading charmingly from left to right we have Mrs. Eddie Stinson, Mrs. Phoebe Fairgrave Omlie, Mrs. Frank Hawks, and Mrs. Bert Hull, standing beside "Chiggers", entry No. 26, a Monocoupe, which Mrs. Omlie flew herself. The other ladies were passengers. I'm sorry Mrs. Billy Brock isn't in this group—she's an added attraction to any picture, and ought to be here. She was probably keeping an eye on Billy, in case he should slip off to that night club with George and me—the old boy's right slippy on his feet for a fat man. And also I regret that Mrs. Cloyd Clevenger, Mrs. Vance Breese, and Mrs. E. F. Schlee are not pictured—they should be in the group. But say,—if it shows up as well in the cut as it does in the photograph I am admiring—just notice the far-away, sort of calculating look in the eyes of Mrs. Edward Stinson, of Detroit. Can it be that she is watching the old boy swaying like a lily in the breeze, just to her right? Distinctly a wifely look, rest assured of that by one who knows.

Now, I'll tell you something that perhaps you don't know. It takes more than an ordinary woman to fly 6,300 miles on an Air Tour, or any considerable part of that mileage, even as a passenger. And it takes a very extraordinary woman to fly all of those 6,300 miles herself. The constant travelling, the rushing about, the living in suit-cases for a month, the disadvantages of some hotel rooms, the bad food and the worse speeches common to so-called banquets, all tend to try the patience and sour the temper. Yet when I met this Tour at Fargo and jogged along with it to Detroit, all of these ladies were able, not only to smile, but to laugh—even in the more painful moments of a standard Harvey Campbell speech. Volumes could not say more. The women were wonderful. In short, they were good fellows, taking the rough with the smooth, not presuming on their sex for any special favors, or demanding finer accommodations than were available for male pilots or mechanics.

The Greatest Race of All

—*A Statement from* ANTHONY H. G. FOKKER

I AM sometimes asked why we do not enter specially-built or specially "tuned up" Fokker Aircraft in public air races. This brings up the further question,—Can airplane manufacturers, and ultimately the purchaser, benefit from air racing? I do not fail to appreciate the immense importance of air races in popu-



larizing American aviation. But, after all, the air-mindedness of America has undoubtedly been influenced to a far greater degree by the famous long-distance flights in which Fokker Aircraft, practically stock models, have played no small part.

It has been known for the past twenty years that *the cleaner the airplane, the better its performance . . .* and the rest is still a question of engine power. What is it, then, that the airplane builder seeks? What does the purchaser want? Is it speed? *Or is it the ideal combination of airworthy dependability, ruggedness and safety with performance?*

No company or private owner can afford to support aircraft, however fast in flight, without the primary



factor of economy. Nor is it possible to combine the utmost of *every* factor in a single airplane! What I should like to emphasize is the fact that the designers and manufacturers of Fokker Aircraft *have consistently refused to sacrifice such important characteristics as economical maintenance and long, unbroken service life, carrying capacity, and flying qualities at all speeds,* merely in order to squeeze out a few more miles-per-hour.

Fokker Aircraft travel at speeds that satisfy the commercial purpose for which each type is designed. Indeed, they go far beyond all questions of speed, *for they fly constantly, on time-table schedules, with safety to passenger and cargo, at that reduced-throttle performance which means long life to engine and plane.* I suppose there has been no more splendid instance of commercial value than the demonstration recently made by one of our pilots in our Super-Universal Wasp-powered monoplane, covering 25,000 miles, stopping at 40 airports new to the pilot, in 230 hours of actual flying time, and spending less than $25 for repairs and replacements.



The "racing field" in which we enter Fokker Aircraft, *is the open field of the world's air traffic.* Every Fokker airplane is destined for this greatest "race" of all! The success of Fokker long-distance flights only confirms what has been proved over and over by precisely the same types of Fokker Aircraft in performance of their commercial duties. The safety record of these planes in regular daily transport (considering the many millions of miles accredited to them), together with their speed, economy and reliable flying qualities



through all conditions of weather and climate, surely must place Fokker airplanes well up to the front on the score card of that supreme contest which all aircraft builders are proud to enter—the contest of public service.

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factory: Wheeling, West Virginia

Subsidiary: Atlantic Aircraft Corporation, Teterboro Airport, Hasbrouck Heights, New Jersey

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VOUGHT PRODUCTION

AN outstanding example of the successful application of modern progressive-assembly manufacturing methods to aircraft production is to be found at the plant of Chance Vought in Long Island City, New York.

The Vought organization is one of the oldest and largest producers of military airplanes in the United States and has earned an enviable reputation for design leadership and character of product.

Conservative expansion under an uninterrupted and profitable manufacturing program characterizes the Vought organization's activities since back in the 1918 days.

Vought airplanes are distinctly Vought, and follow the original design trend developed years ago by Chance Vought and his engineers. The engineering put into these splendid planes is of an original and finished order and their production is carefully carried on with quality a paramount requirement. A visit to the Vought plant immediately impresses one with the smoothness with which this efficient organization carries on real production. Parts seem to flow in exact sequence to the final assembly line, where the planes on the two long progressive lines gradually grow from a bare steel frame to a complete fuselage ready for engine test.

The operations of the Vought company in Long Island City now occupy approximately 125,000 square feet of floor space. This is divided in three buildings. Building No. 1 (which formerly housed the entire operations) is used for the fabrication of parts, including wood parts, metal parts and fittings, tail surfaces, cowling, etc. The general offices are also located in this building. Building No. 2 is devoted exclusively to the large Vought Engineering Organization and the Experimental Department. Here all the engineering work required in connection with production models, and all design and experimental work on new Vought designs are carried on. In Building No. 3, an imposing 6-story brick and concrete structure, all fuselage fabrication, final assembly, fabrication of wings, finishing, and packing are carried on. The assembly line in this building is the most interesting feature of the entire plant.

A special equipment feature of the Vought plant is a new doping and finishing department, which is probably the most modern and healthy in the industry. This room is automatically heated to maintain proper temperatures for finishing processes. The ventilation system installed removes the disagreeable dope fumes and greatly increases the efficiency of the finishing operations. Large spray booths are located at the east and west ends of this department, with a series of ventilators interspersed in the outer wall to pull the fumes directly off the floor of the doping sections. The spray booths are used for spray varnishing and enamelling only. All Vought "doped" surfaces are hand brushed as this method insures a vastly superior and longer-lived finish to withstand the rigorous exposure to which Vought planes of necessity are subjected on the U. S. Navy's battleships, cruisers and aircraft carriers. In this department the quick, modern spraying method of applying lacquer finishes cannot be successfully employed and obtain the proper quality of finish demanded by the Navy Department.

The Wing Department requires over 100 men. The various types of wing ribs are fabricated in a section of this department, and after inspections, these ribs are turned over to the wing assemblers who slide the ribs over the spruce beams to the proper locations, make all the necessary joints, put on the nose and trailing edge strips, and fasten the veneer nose covering, the laminated end bows, the connection fittings, wiring for lights, bonding for radio, etc.

In the Covering Department women are employed exclusively. In this department the cloth covers are sewed, slipped over the wings and tail surfaces, and then carefully fastened to each rib by sewing through.

In the Fuselage Fabrication Department each tube of high tensile strength chrome-molybdenum steel is cut and slotted for fit-

(*Continued on next page*)



Interior of Vought plant showing progressive assembly system similar to that used in modern automobile factories. Top—final cowling assembly; tubular fuselage fabrication. Below—fuselages ready for fairing, and after engine installation.



VOUGHT ACHIEVEMENTS

THROUGHOUT the decade of its existence, the Chance Vought Corporation has consistently maintained its reputation as the builders of the most advanced types of airplanes.

The success and growth of the organization has been due to its substantial background, efficient service rendered, and the policy of learning by close contact what flyers need. Then, with the Vought resources, engineering skill, and manufacturing ability, producing the finest airplanes it is possible to build.

Throughout its existence, the company has employed the most modern manufacturing methods, and has always prided itself on the *quality* of its products—the result of unhurried precision workmanship and selection of the finest materials.

And without the close cooperation of those who supply the company with materials and equipment for these famous planes, the Vought achievements would not have been possible.

CHANCE VOUGHT CORPORATION

Long Island City, N. Y.



Building 1—parts fabrication department.



Building 2—engineering and experimental department.

(*Continued from preceding page*)

tings on machines. The all-steel fuselage is made in two parts, the tail sections and front portions being built up on accurate steel jigs, and then joined together by welding. The welding throughout shows a high quality of workmanship. After completion of the fuselage frame, the interior of all tubes are heavily coated with linseed oil for protection against corrosion, the exterior painted with red oxide primer and two coats of aluminum enamel, and the frame is ready to go onto the Final Assembly line.

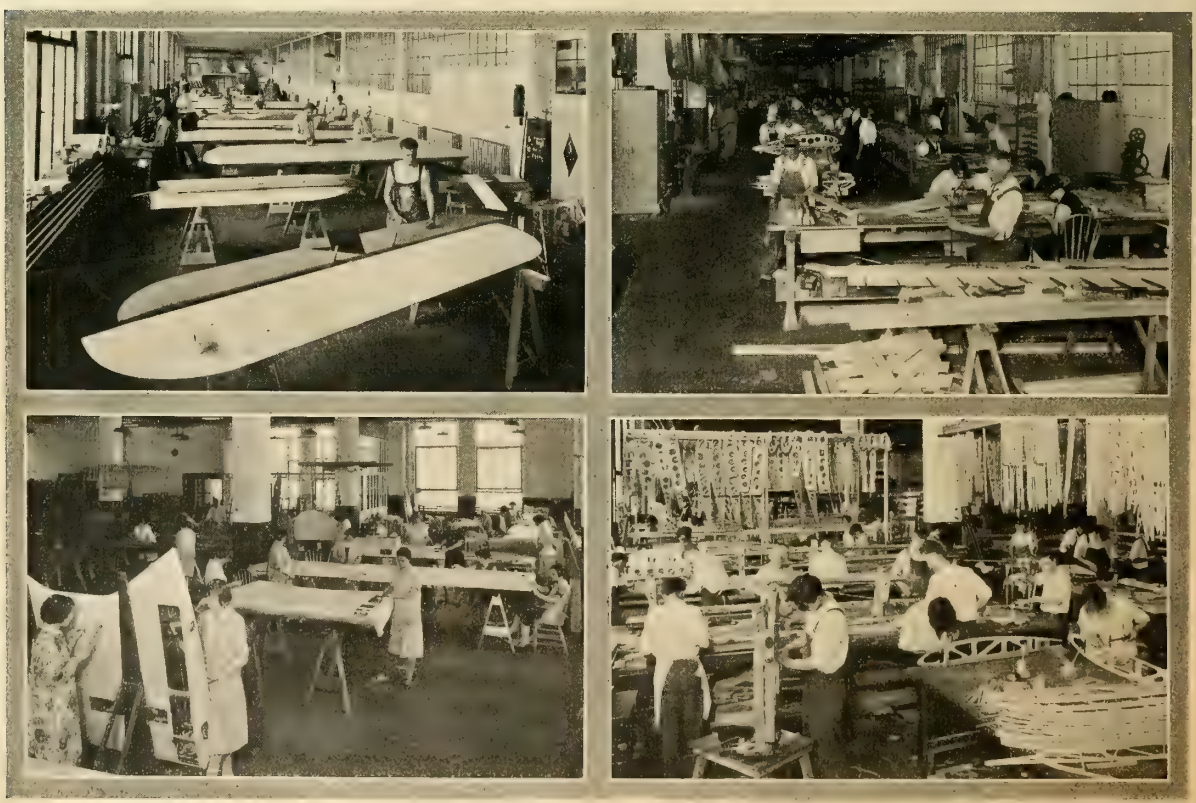
Probably the most interesting portion of the Vought plant is the Final Assembly Department. Here one sees two long lines of fuselages, mounted on steel trucks, progressing along tracks laid down on the floor, beginning at one end with the bare fuselages and ending at the other with completed fuselages ready for the engine test.

And each day at least one completed plane comes off this production line. This progressive assembly method is designed after the production lines used so successfully in all the automobile plants, and the Vought company is the first in the airplane industry to adopt this method. Each group of men along the line has its particular job to do on the fuselage, one group putting on the fairing which gives the Vought Corsair its beautiful body lines, another group installing the controls including the rudder pedals, another the stick controls, another fastening on the engine mount and installing the Pratt & Whitney Wasp air-cooled engine, others putting in the seats, fastening on the cowling, fitting the tail surfaces, installing the instruments, etc until at the end each plane has all the parts, accessories and equipment required in a high-performance military airplane.

Throughout the construction of Vought planes an extensive and exacting method of inspection is followed. In addition to the Navy's inspectors, twelve company inspectors inspect materials and processes from the time the raw material comes in at the receiving door until the completed planes leave. An inspection is made of practically every operation on each part.

In this efficient airplane plant there are now employed approximately 600 men, many of whom have been with the company for many years, and all of whom are really interested in their work. Their working conditions are ideal, all buildings having good light, ventilation, modern machinery and up-to-date equipment. In addition to providing such working conditions for its employees, the Vought management in the past has shared its profits with its employees by awarding a yearly bonus. These considerate policies have resulted in satisfied employees as well as a low rate of turn-over.

(*Continued on next page*)



Top—fireproof dope room where Corsair wings and surfaces are finished; portion of wing assembly department. Below—wing covering department; wing rib fabrication.



The First Commercial Corsair

The Pratt & Whitney Aircraft Company recently received delivery of the first commercial Vought "Corsair." Fitted with a series "B" commercial "Wasp" engine, this ship is now in regular service for high speed business travel of the executives of the company.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

(*Continued from preceding page*)

After going through the Vought plant and talking with its executives, it is easy to visualize the solid background upon which its success and prominence has been achieved. Upon investigation, it is found that this organization, although still privately owned and under conservative management, has actually been the second largest producer of planes in the United States since the World War, ranking next to the Boeing Airplane Company of Seattle, Wash. It has been the largest producer of air-cooled engined planes. The Vought company has a remarkable record of advanced engineering and steady production behind it—having been in continuous quantity production since the war.

This success is based on the policy of steadily expanding operations, yet quite in keeping with the growth of the airplane industry and the demand for its products. By virtue of specialization, advanced design, proven performance and quality of product, the various successive Vought models have quickly established their merit and elevated production into non-competitive classes. The company was originally formed in 1918, and the first Vought product, the Model VE-7, won the U. S. Army Air Corps training plane competition. The succeeding models down through the famous UO series have become the standardized equipment for two-place observation purposes of the U. S. Naval Air Service, the requirements of which include quick conversion from land to sea-plane, catapulting from the decks of the Navy's battleships and cruisers, deck landings on the aircraft carriers, and many other difficult missions.



Building 3—fuselage fabrication and final assembly, wing assembly, finishing and packing departments.

The latest Vought model, the Corsair, which is now in quantity production at the Vought plant, is a high-performance general purpose 2-place Naval airplane of the convertible type, which, however, is easily adaptable for sport or fast transport use. This model has established four world seaplane records for speed and altitude, and is considered to be the finest plane of its type in the world. The Corsair is also used by the U. S. Marines, and a number of them have been given yoeman service with the Marines in Nicaragua. It was a Vought Corsair which was used by Lieut. C. F. Schilt in his rescue of 18 seriously wounded Marines from Quilali, Nicaragua, by landing ten times in a quickly prepared, extremely rough field only 70 feet wide and 300 feet long. For this feat Lieut. Schilt was awarded the Congressional Medal of Honor.

Some $2,500,000 worth of Corsairs have already been purchased by the U. S. Government, and with the recent development of this plane into a high-speed amphibian type, its utility and future sales prospects have been further increased. This amphibian weighs 1,000 pounds less than the present service types and has a high speed 20 miles per hour greater.

The shipments of planes and parts from the Long Island City plant during the month of June, 1928, were valued at $267,500. This amount does not include the engines, propellers, floats, instruments, etc., as all of these items are supplied by the Government for installation in the present production Corsairs. If these latter items were evaluated for comparison with shipments as reported by commercial plane manufacturers, the June shipments would be the equivalent of over $500,000.

Shipments for the first six months of 1928 showed an increase of 120 per cent over the corresponding period of 1927. During July, a new high record for shipments was made, when the shipments of Vought airplanes to the U. S. Navy alone totalled $302,750. This is 200 per cent greater than during July, 1927, and a new record is sure to be made during the last six months of 1928. The August shipments were slightly less than July due to changes enforced by modified Government furnished material, but already record September shipments have been made and the total deliveries scheduled for September to the U. S. Navy alone will break all previous month's records.

The Chance Vought Corporation Specifies RIPLEY STRAINERS & SCREENS

Some of the different parts which we make are as follows:

Air Exhaust Screens	Gas Tank Suction Tube Assemblies
Air Intake Screens	Inlet Screens
Baffle Plate Strainers	Oil Filler Pipe Strainers
Breather Pipe Screens	Oil Pump Strainers
Carburetor Gauze	Oil Screen Assemblies
Carburetor Screens	Oil Strainers
Float Valve Strainers	Vacuum Pump Screens
Fuel Oil Screens	Water Strainers
Gas Tank Strainer Screens	

We specialize in the manufacture of Strainers, Screens and Assemblies for the purpose of straining—we make nothing else. Made to order in accordance with your ideas, sketches or blueprints and specifications.

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The Chance Vought Corporation have favored us with their business for many years. Their needs are diverse and exacting, but we are equipped to serve the most particular accounts, having always considered

Stock Assortment—Quality—Quick Delivery
The principal features of our business.

YARDS *and* WAREHOUSES
Long Island City - Manhattan - Brooklyn - Hoboken

BENT WOOD PARTS ~~~~ PERFECT AIRPLANE ASH

48 years of experience and progress in bending wood and selection of Second Growth Ash Stock is back of every piece we furnish for VOUGHT machines.

EST. 1880 H. G. SHEPARD & SONS N.H. CONN. BENT WOOD TRADEMARK

No doubt the great Vought Corporation could make airplanes without our product of Bent Wood Parts and Second Growth Eastern Ash, but we take pride in the fact that they prefer not to.

It's Vought Quality

H. G. SHEPARD & SONS NEW HAVEN, CONN.

PIONEER Fuel Level Gauge

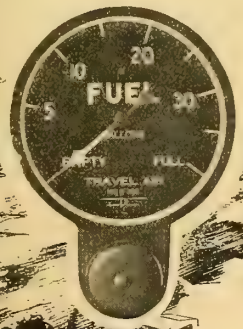


Shows the fuel level accurately. It does away with guess work. It saves that hour wasted in a descent for fuel "just to be on the safe side".

It saves the peril of a forced landing because the pilot "guessed wrong" about his fuel supply.

The Pioneer Fuel Level Gauge, too, combines delicate precision with sturdy performance—it is a time saver and a dependable safety device that should be on every ship.

Ask for descriptive literature.



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Check the items in which you are interested, tear out the list, mail it to us, and we will send descriptive folders.

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Climb Indicator	☐
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Earth Inductor Compass	☐
Engine Gauge Unit	☐
Flares	☐
Flight Indicator	☐
Fuel Level Gauge	☐
Fuel Pressure Gauge	☐
Fuel Strainer	☐
Hand Fuel Pump	☐
Holt Flares	☐
Lamps, Instrument	☐
Landing Lights	☐
Navigation Lights	☐
Octant	☐
Oil Pressure Gauge	☐
Power Fuel Pump	☐
Refueling Pump	☐
Sextant	☐
Speed and Drift Meter	☐
Tachometer	☐
Tachometer Shaft	☐
Thermometer	☐
Turn Indicator	☐
Watch	☐
Wiley Flares	☐

PIONEER INSTRUMENT COMPANY
754 LEXINGTON AVE. BROOKLYN NEW YORK

THE PIONEER FUEL LEVEL GAUGE AND OTHER PIONEER INSTRUMENTS ARE STANDARD EQUIPMENT ON CHANCE VOUGHT AIRPLANES

FLOTATION GEAR

BY



BREWSTER

STANDARD EQUIPMENT

ON

VOUGHT "CORSAIR"

BREWSTER & CO.

—AIRCRAFT DIVISION—

BRIDGE PLAZA, LONG ISLAND CITY, N. Y.



SPEED *and* SAFETY... "CORSAIR" *and* SOCONY

AN ideal flying combination—the Chance Vought "Corsair" fueled with Socony Aviation Gasoline, lubricated with Socony Aircraft Oil.

Ideal, first because of the mechanical construction of the plane itself. Secondly because of the safety and dependability of Socony products.

These two things, safety and dependability, have won for Socony an enviable reputation in the airways and on the roadways.

SOCONY

REG U.S. PAT. OFF.

AVIATION GASOLINE—AIRCRAFT OIL

STANDARD OIL COMPANY OF NEW YORK



QUALITY SEEKS ITS OWN LEVEL!

Planes by

CHANCE VOUGHT CORPORATION

Paints and Varnishes by

EDWARD SMITH & COMPANY

Just as men of quality seek each other's society, so are materials of truly high character sought and used by manufacturers of high quality products.

A signal commentary on the high quality production standards of the Chance Vought Corporation is that, out of an exceptionally wide source of supply, they have chosen to use Edward Smith Escolac Lacquer, Aquatite Spar Varnish and Metal Wood Enamel for protecting the exposed surfaces of their aircraft—three products which have proved their exceptional durability under all conditions of aircraft service.

We shall be glad to consult with other aircraft manufacturers who are interested in finishing materials on the basis of low cost per year. EDWARD SMITH & COMPANY, Long Island City, N. Y., Makers of Paints and Varnishes Since 1827.



FOLLOW THE CHOICE OF EXPERIENCE

When Chance Vought specified Standard Steel Propellers as standard equipment on his planes he followed the choice of experience. A Standard Steel Propeller-equipped plane won the 1927 and 1928 National Reliability Tours . . . they were used on most of the successful Trans-Atlantic and Trans-Pacific flights . . . a Standard Steel Propeller pulled Art Goebel across the continent on a record-breaking non-stop flight . . . they are used by the majority of planes in the National Air Races, by the Army, Navy and many Air Mail companies. Such preference warrants your investigation.

STANDARD
PITTSBURGH
PENNSYLVANIA
STEEL PROPELLER CO.



Applying Perry-Austen Dope in the Chance Vought Corp. plant.

Perry-Austen Dope Is Used Throughout *on the* VOUGHT "CORSAIR"

In spite of present day competition the Chance Vought Corporation and many of the largest and oldest airplane manufacturers have used Perry-Austen Dopes ever since they started manufacturing planes.

Because

Perry-Austen Dopes are the safest and most reliable to use. There is 20 years of practical experience and scientific research behind every Dope. Approved by the U. S. Army and Navy for use on their planes.

Manufactured by

PERRY-AUSTEN MFG. CO., pioneer Dope makers of the United States.

Main Office & Works: Grasmere, Staten Island, N. Y.

TELEPHONE DONGAN HILLS 706-707

Chicago office: 510 Dearborn St. *Telephone Superior 6948*

Authorized Dealer: AIR ASSOCIATES, INC., Curtiss Field, Long Island, N. Y.

A REVELATION IN LUBRICATION

TRADE MARK REG U.S. PAT. OFF.

WOLF'S HEAD OIL

WOLVERINE LUBRICANTS COMPANY INC.

Number 8

Wolverine Lubricants Co., Inc.

New York

CHANCE VOUGHT

"Where additional strength and water resistance are required"



finds HASKELITE superior

THE Chance Vought Corporation—users of HASKELITE blood-glue plywood practically since its introduction, write, "We have found your blood albumen glued plywood superior to casein glued plywood where additional strength and water resistance are required."

Naturally, then, the Vought Airplanes which have established various new records during the last year and a half have been constructed with HASKELITE plywood.

Over 85% of the plywood used in airplanes is manufactured by us. For strength, light weight, and waterproofness, HASKELITE plywood is preferred.

We will send our interesting blue print booklet on aircraft applications to anyone requesting a copy.

PLYWOOD HASKELITE PLYMETL

AD 10 Gray

Haskelite Manufacturing Corporation

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CALIFORNIA PANEL & VENEER COMPANY
955 South Alameda Street
Los Angeles, California

AERONAUTICAL CHAMBER OF COMMERCE

RAILWAY & POWER ENGINEERING CORP., LTD.
Montreal Toronto Winnipeg
New Glasgow

FLIGHTEX FABRIC

REGISTERED U.S. PAT. OFF.

THE "Chance Vought Corsair" famous Navy plane is built to endure all kinds of service on both land and water. The Navy demands the best. Naturally Flightex protects this phenomenal plane.

Mfrs. of FLIGHTEX

E. S. TWINING & COMPANY

320 Broadway, N. Y. C.

Authorized Distributers

Air Associates, Inc.
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Nicholas-Beazley Airplane Co.
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Dependability *means* Safety

ENGINEERING Accuracy has won world-wide acclaim for the Chance Vought famous Navy Plane "CORSAIR." Careful construction — meticulous inspection — consistently fine parts — these are insisted upon.



Which means that the Chance Vought Corporation invariably specifies our *Aircraft Screw Products* for use on their planes.

And this is but one of the many instances to prove how the aircraft industry relies on our Aircraft Products for dependability and safety.

Write us today

AERO SUPPLY MANUFACTURING CO., INC.

COLLEGE POINT, L. I., N. Y.

Write us for estimate on standard Hex Bolts, Tie Rods, Nuts, Turnbuckles, Cable, Shackles, etc.

On the famous Vought "Corsair"



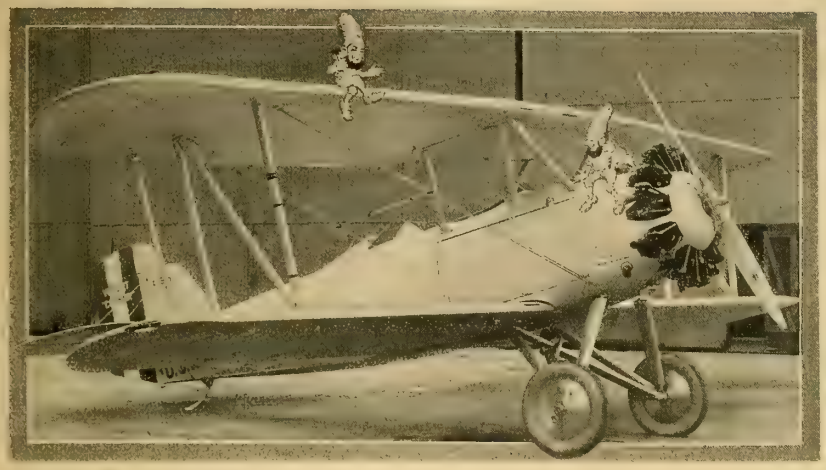
Smith-Hafecost metal fittings play their part in the remarkable success which all Vought planes enjoy.

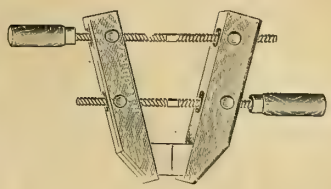
Our plant is fully equipped to turn out machine parts and aircraft fittings for all aircraft requirements.

We welcome the opportunity to work with aircraft manufacturers in solving whatever problems they have of this nature.

SPECIALISTS IN
TOOLS
DIES
FIXTURES
JIGS
OF ANY DESCRIPTION

SMITH-HAFECOST, Inc.
129 Grand Avenue
Brooklyn, N. Y.





The Jorgensen Adjustable Hand Screw will grip and hold angular or straight work with equal facility—fully illustrated on page 285 of our catalog No. 600.

Hammacher, Schlemmer & Co.

Since 1848

4th Ave. at 13th St., New York, N. Y.

Phone Stuyvesant 7000

"The largest stock of Hardware, Tools and Factory Supplies in New York"—is a reputation we have upheld for eighty years.

The Vought "Corsair" is a sturdy ship—from nose to tail. It is sturdy because it is designed by some of the greatest aeronautical minds in the country, assembled by skilled mechanics—AND because only the finest materials are used in its construction.

Hammacher, Schlemmer & Co. is proud to announce that many of their products are built into this fine ship and that their tools are used in the expansive Vought workshops. Some of the principal items which we furnished for the construction of the "Corsair" are as follows: Bolts, Nuts, Screws, Door Catches, Clamps, Hand Screws, Drills, Files, Hinges, Benches, Respirators for the "dope" room, Glue Pots, etc.

Send for our catalog No. 600—a Reference Book for Purchasing Agents, Superintendents, and Department Heads.

KA-U-R-I TRADE MARK

ALUMINUM PAINT

Quick Drying
Non-Settling
Good Covering
Extremely Durable

AIRPLANE VARNISH

Quick Drying (2 or 3 hours)
Waterproof
Elastic

Both of these products can be brushed or sprayed. CHANCE VOUGHT is using both our Aluminum Paint and Varnish exclusively on his planes.

BROOKLYN VARNISH MFG. CO.

35 Nostrand Ave. Brooklyn, N. Y.

CROSS, AUSTIN & IRELAND LUMBER CO.

1246 Grand St. Brooklyn, N. Y.

Specializing in Aviation Woods

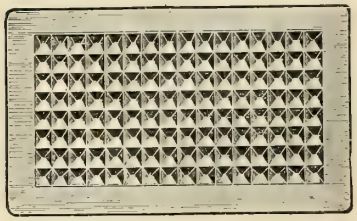
Kiln dried airplane spruce for spars, hulls and fuselage, furnished rough or finished.

Wing and aileron spars, hull and fuselage parts milled to any size or sketch desired.

GRADING IN ACCORDANCE WITH ARMY AND NAVY SPECIFICATIONS

We also carry in stock: Bass, Birch, Maple, Ash, and Oak.

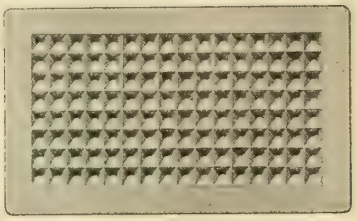
ALUMINUM MATTING
Is a Necessary Aircraft Material



Non skid, rust proof, impervious to gasoline, oil, salt water and the destructive action of the elements. Remains bright and clean indefinitely and requires no attention.

Because of its non-corrosive qualities, durability and extremely light weight, a number of prominent aircraft manufacturers are using Aluminum Matting exclusively for cockpit flooring, steps and similar purposes. We are now furnishing large quantities of this material to the Government for these purposes and anticipate an increased demand from the industry during the coming season.

We would like to hear from interested manufacturers and supply houses and will be pleased to furnish them with more detailed information on request.



Used on the running boards of practically all the fire fighting apparatus in the United States and standard equipment on many of the high grade automobiles.

ERDLE PERFORATING COMPANY
Perforated Sheet Metals
171 York St. Rochester, N. Y.

Manufacturing **Experimental Work**

9
YEARS ASSOCIATION WITH CHANCE VOUGHT

For nine years this organization has been supplying metal parts for Vought Airplanes. These parts have been made from their prints and specifications, subject to U. S. Government inspection.

We are proud that we have contributed in a small way to the dependability of Vought planes.

Manufacturers of
FLAT METAL FITTINGS STAMPINGS CONTROLS
SCREW MACHINE PARTS, ETC.

CURRAN MACHINE WORKS
159 Newtown Road
Long Island City, N. Y.
Dies and Tools Aircraft Metal Parts

BERRY BROTHERS' FUTURE
is Tied up with
the Aircraft Industry

Berry Brothers' shipments tell the story of progress in the aircraft industry as plainly as the sock indicates wind direction. Sales to the Chance Vought Corporation and other leading aircraft builders climb to new peaks each month as the industry forges ahead.

So the great success of Vought airplanes has been reflected in Berry Brothers' sales curve as this progressive aircraft manufacturer has called for more and more finishing materials.

Berry Brothers is proud of the recognition accorded by such companies as Chance Vought. We believe in aviation and pledge our continued cooperation to further the cause.

PROGRESSIVE AIRCRAFT FINISHES

BERRY BROTHERS
Varnishes Enamels and Lacquers
Detroit, Michigan *1858—70th Anniversary—1928* *Walkerville, Ont.*



"...and the 'Corsair' arrived O.K."

ALL Chance Vought planes, when crated for shipment, are boxed by the Long Island Packing Box Co., Inc. They all arrive at their destination safely.

Packing an airplane is not an easy task and is no job for amateurs. This company is expert in the manufacture of crates and boxes and fully appreciates the hazards of faulty shipping.

We are desirous of handling this work for several other aircraft manufacturers and are prepared to submit estimates on any quantity.

LONG ISLAND PACKING BOX CO., Inc.
Van Dam Street Long Island City, N. Y.

MODERN PRODUCTION EQUIPMENT

Machine tools Woodworking machinery

at worthwhile savings

Our stock includes machine tools of every description besides various types of woodworking and metalworking machinery.

The greater part of the Chance Vought plant has been equipped with tools and machinery from our stock.

Write for our latest list

MOREY and COMPANY, Inc.
410 Broome Street
New York City

Lee Spring Company, Inc.
30 Main Street
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Manufacturers of all kinds of Airplane Springs



CHANCE VOUGHT USES THEM

The highest price lock washers in the market are Kantlinks.

They cost more than any other lock washer because

—*they do not rust.*
—*they assure you increased holding power.*
—*they do not tangle or interlink.*
—*in short Kantlinks are the best that money can buy.*

Chance Vought and other leaders in airplane manufacturing as well as in other industries have tested and adopted them. They are the most dependable and the most efficient lock washers made, and in the long run they are the most economical.

Samples For Test Will Be Sent Upon Request.

THE NATIONAL LOCK WASHER COMPANY
Newark, New Jersey, U. S. A.

Sales Offices:
BUFFALO, CHICAGO, CLEVELAND, DENVER, DETROIT, LOS ANGELES, MILWAUKEE, NASHVILLE, NEWARK, NEW YORK, ST. LOUIS, ST. PAUL, SAN FRANCISCO.
Canada: TORONTO, MONTREAL.

KANTLINK TRADE MARK LOCK WASHERS

Plating:

Super CHROME

The Time-Tested Process of Chromium Plating

Udylite

Rust-Proofing Process

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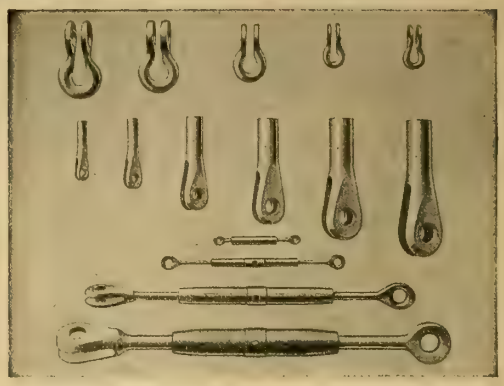
Depositors of

NICKEL, COPPER
BRASS *and* SILVER

KEYSTONE

Electro Plating Co., Inc.

14th Street and Van Alst Avenue
LONG ISLAND CITY
600 West 57th Street, New York City



STANDARD AUTOMATIC PRODUCTS CO

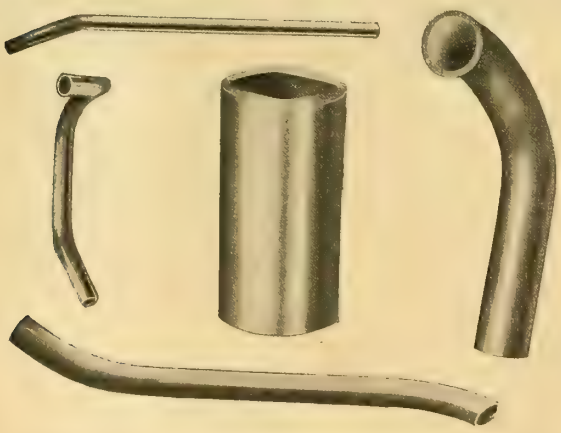
ORIGINAL MANUFACTURERS OF
STANDARD TYPE TURNBUCKLES

Airplane parts of merit
SHACKLES, TURNBUCKLES, CLEVIS ENDS
CLEVIS PINS, AIRCRAFT BOLTS
(milled from bar)

Direct Contractors to United States Army and Navy and many airplane manufacturers

In the manufacture of their high grade airplanes the CHANCE VOUGHT CORPORATION uses the products of the

STANDARD AUTOMATIC PRODUCTS CO.
Corry, Pennsylvania



SUGGESTING—

the diversity of our fabricated tubing and its applicability to the aircraft industry.

Exhaust stacks of the Vought "Corsair" are made of our tubing.

STEEL & TUBES, Inc.

Main Office
226 East 131st Street Cleveland, Ohio
Brooklyn plant: 308 Scott Ave., Brooklyn, N. Y.

OF COURSE

AQUATITE

WATERPROOF PLYWOOD

WAS SELECTED BY

CHANCE VOUGHT

for their aircraft, as every part in their planes must be absolutely the best obtainable.

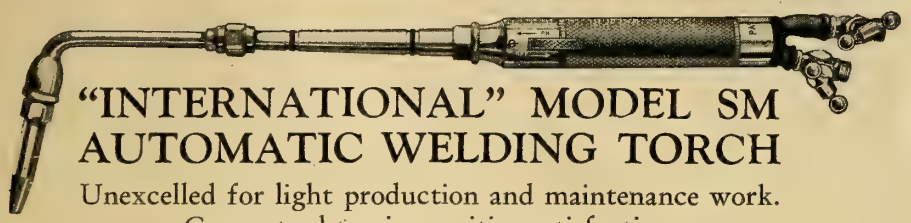
THIS EMBLEM



YOUR GUARANTEE

CRESCENT PANEL CO.
LOUISVILLE, KY.

We are proud of the part we have had in the success of VOUGHT AIRPLANES



"INTERNATIONAL" MODEL SM AUTOMATIC WELDING TORCH

Unexcelled for light production and maintenance work.
Guaranteed to give positive satisfaction.

ALL OUR BRANCHES CARRY STOCK OF A COMPLETE LINE OF WELDING AND CUTTING EQUIPMENT AND SUPPLIES — TORCHES, REGULATORS, WELDING RODS, FLUXES, ETC.

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INTERNATIONAL OXYGEN COMPANY

Manufacturers of OXYGEN-HYDROGEN-ACETYLENE-NITROGEN

I.O.C. SYSTEM INDUSTRIAL GASES

MAIN OFFICE – NEWARK, N. J.

Branches: New York Pittsburgh Toledo Buffalo

I.O.C. SYSTEM INDUSTRIAL GASES

NEW ENGLAND DIVISION—THE TARIFFVILLE OXYGEN CO., TARIFFVILLE, CONN.

ECLIPSE

is proud to be identified with the

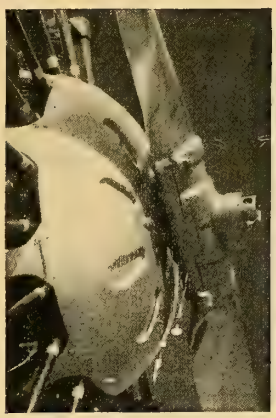
CHANCE-VOUGHT "CORSAIR"

ECLIPSE MACHINE COMPANY

Aviation Engine Starters and Generators

EAST ORANGE PLANT

EAST ORANGE NEW JERSEY



[Circular spun engine nose cowling .... 36″ by 8″ .... with adjustable shutters to control the air-blast on engine cylinders and crank-case under varying operating conditions... spun for *The Corsair* by Magosy & Buscher.]

CHANCE VOUGHT .... specifying the best for the CORSAIR ... naturally insists on metal spinnings by Magosy & Buscher, as do other leading 'plane builders. ¶Our reputation for micrometer precision... and our facilities for handling the unusually large spinnings required in plane construction .... place us in an exceptional position as "aircraft streamline specialists."

Ask us to quote on all spun or hand-hammered metal work from your blueprints.

MAGOSY & BUSCHER

Specialists in Aircraft Streamlines

120 WALKER STREET • NEW YORK CITY

SUMMERILL SEAMLESS TUBING

"Birds of a feather....."

IT is understood that a quality product is made up of quality units and it is therefore only natural that CHANCE VOUGHT, one of the leading producers of aircraft in this country, demands Summerill Tubing for the construction of his planes.

For more than a quarter of a century this organization has been manufacturing Seamless Tubing and for more than ten years has been identified with Aviation.

Tubing furnished to specification in Straight Carbon, Nickel Steel and Chrome Molybdenum. Manufacturers and Warehousers of Round, Square, Streamline, etc.

SUMMERILL TUBING COMPANY
Bridgeport, Montg. Co., Pa. (Philadelphia District)

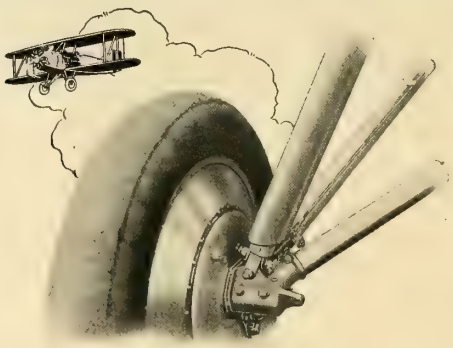
Roebling

Aircraft Products are Dependable

Galvanized Aircraft Strand
Galvanized Aircraft Cord
Tinned Aircraft Wire
Tinned Aircraft Cord
Aircraft Thimbles
Aircraft Ferrules
Electrical Wires and Cables
Locking and Serving Wire
Welding Wire

John A. Roebling's Sons Company
Trenton, New Jersey

AIRCRAFT CORD



Castings That Must Be Right!

In the famous "Corsair" plane the Tube End Fittings and Landing Gear Axle Fittings are Electric Steel Castings produced by Lebanon Steel Foundry.

We specialize in carbon and alloy steel castings of every description.

LEBANON STEEL FOUNDRY
Electric Furnace Steel Castings
LEBANON PENNA.

In the cockpit

THE LARGEST plant in world producing upholstery leather for automobiles and busses has devoted a large portion of its plant and personnel to the production of leather for aircraft.

The Chance Vought Corporation, producers of the dependable Vought "Corsair", use General Leather exclusively in the cockpits of their ships.

GENERAL LEATHER COMPANY
NEWARK, N. J.

AMONG THOSE PRESENT . . . . . .

We are pleased to announce that this company is included among those manufacturers whose products enter into the construction of the famous Vought "Corsair."

We supply:

EXHAUST STACKS
IGNITION CABLE TUBES
INLET MANIFOLDS
OIL LINES

Manifolds and Bent Tube products made to your specifications.

American Tube Bending Co., Inc.
5-7-9 Lawrence Street
New Haven, Conn.



TIE RODS and COMMERCIAL FLYING

Commercial aircraft are called upon to meet strains and stresses unknown to military ships. Temperature extremes, cyclonic disturbances, night landings— the commercial ship must carry on regardless.

Therefore, they require just as high quality materials and workmanship as combat planes. All Hartshorn Tie Rods are built to U. S. Army and Navy standards — the highest in the world.

Equip the ship you build, or fly, with Hartshorn Streamline and Square Section Internal Tie Rods. They're lighter, just as strong, and safer.

Write for Circular A-1

STEWART HARTSHORN CO., 250 FIFTH AVE., NEW YORK
Established 1860

The Hidden Safeguard
on the
VOUGHT "CORSAIR"

CASCO
TRADE MARK REG. U.S PAT OFF

WATERPROOF GLUE

"Used by Chance Vought" — a story in itself

THE NEW CASCO RED BOOK tells a complete story. Every aero-engineer should have a copy of this reference manual of practical gluing methods. Write for your copy.

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Brewster & Co., builders of the floats used on the —

VOUGHT CORSAIR

—apply Bitumastic Solution between all thicknesses of duralumin and use this highly durable coating to render the interior surfaces of the floats proof against corrosion.

BITUMASTIC
REG. U.S PAT OFF
SOLUTION

Wailes Dove-Hermiston Corporation
17 Battery Place, New York

Philadelphia Cleveland Chicago
Houston Tulsa San Francisco

FLEXIBLE
STEEL WIRE
SHAFTS

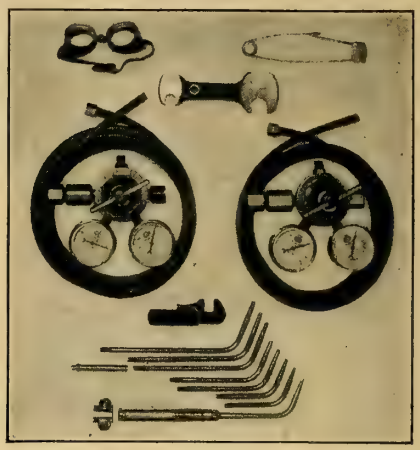
for power transmission around corners and over obstacles — silent, steady durable, strong.

The S.S.White Dental Mfg. Co.
Industrial Division
152 West 42nd St. New York, N.Y.



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Sent free on request

Light and Medium Welding Made Easier and Faster with this New Airco-Davis-Bournonville Outfit, Featuring the 14 ounce No. 8900 Torch.



Ideal for All Airplane Welding

AIR REDUCTION SALES COMPANY

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66 Plants 21 District Offices



IN THE PAINT AND DOPE ROOMS OF THE CHANCE VOUGHT CORPORATION

To provide perfect ventilation for his workmen and to save the time ordinarily lost in cleaning Chance Vought installed Newcomb Syphon Ventilated Cabinets in his paint and dope rooms.

Other noteworthy features of the Newcomb Cabinet are:
Meets Underwriters' requirements
Eliminates shutdowns
Has no pipes to clean
Saves floor space
Is made in sectional parts, trimmed with angle iron with holes punched, ready to be set up and bolted together by any handy man in your plant.
Eliminates all fire menace.
Embodies forty years' experience.

Manufactured by

Grand Rapids Blow Pipe and Dust Arrester Co.
Est. 1887
526-28 Monroe Ave. Grand Rapids, Mich.

Naturally
CHANCE VOUGHT
standardizes on
PARAMOUNT
WELDED ALUMINUM FUEL AND OIL TANKS

. . . because they are lighter, carrying 2½ gallons per pound.

. . . because they are stronger, more rugged, and more durable.

. . . because they have upheld an unusually high standard for over a decade.

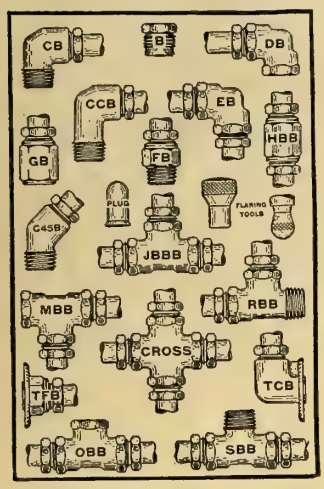
. . . and because every detail of construction is under the personal supervision and inspection of J. Billig, President.


"CORSAIR" FUSELAGE TANK

Send us YOUR blue-prints for estimate

PARAMOUNT
WELDED ALUMINUM PRODUCTS CORP.
431 KENT AVENUE BROOKLYN, N. Y.
PARAMOUNT TANKS ARE BETTER

PARKER



Parker Tube Couplings

are characteristic of American Aircraft.

Our stock of brass and aluminum alloy tube couplings, valves and fuel distribution units is the largest in the world.

Send for literature and sample tube coupling.

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JOHN ADAMS DAVIS

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LACKAWANNA 6123

All photographs used in the advertisements pertaining to the Chance Vought Corporation were made by members of my staff.

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—*By* AERO DIGEST

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Which means: The logical medium for advertising your products to the RIGHT people at low cost.

AERO DIGEST

THE MAGAZINE OF THE AIR

AN APPRECIATION

THE "Corsair" — the latest of the long line of fine Vought Airplanes — has, in actual service, proved its superiority. It has brought back to the United States Four World Records for Speed and Altitude, and has officially shown itself to be the finest plane of its type in the world.

We were asked to design a fine airplane — one to meet the most difficult operating conditions in the service which tries the mettle of an airplane as no other can — the U. S. Naval Air Service. Cost of materials entering into the construction of this plane was held secondary to quality. We selected the talent, materials and equipment for the "Corsair," not on a basis of competition as to price, but according to their inherent quality and service.

And this painstaking care is followed in the construction of each "Corsair," even though they are coming off the long production lines at our plant in rapidly increasing quantities.

We are proud of this airplane and wish to take this opportunity to heartily express our gratitude to everyone who played a part in it. Everyone, it seems, from the engineers and workmen on our staff down to the manufacturer supplying the smallest detail, has worked with a spirit that has made the "Corsair" a masterpiece.

Chance Vought Corporation

Radio Receiving Equipment with Rod Antenna for Reception of Beacon and Weather Service

By Dr. F. H. Drake

Aircraft Division, Radio Frequency Laboratories, Inc.



Fig. 1. Pitcairn Mailwing equipped with rigid rod antenna.

THE rapid growth of air transportation in freight, passenger, and mail service together with the recent development of radio aids to air navigation in the forms of beacon and weather service has created an immediate demand for a sensitive airplane radio receiver. The Department of Commerce has assigned to aircraft radio beacons the frequency band 285 to 315 kc., and to telephone stations broadcasting weather service to airplanes the band 315 to 350 kc. It is the purpose of this article to describe briefly and in non-technical language the airplane radio receiving equipment developed by Radio Frequency Laboratories, Inc. of Boonton, New Jersey, for reception of both beacon and telephone signals in these frequency bands. For a more detailed description of the crossed-coil beacon and the extent and nature of the government services available in this band the reader is referred to articles by Capt. W. H. Murphy[1], by J. H. Dellinger and Haraden Pratt[2], and to publications of the Department of Commerce pertaining to aeronautics.

[1] W. H. Murphy: "The Interlocking Equisignal Radio Beacon"; *Aero Digest, p. 172, August,* 1927.

[2] J. H. Dellinger and Haraden Pratt, "Development of Radio Aids to Air Navigation," *Proc. Inst. Radio Engs.*, 16, July, 1928.

For some time past engineers of the Radio Frequency Laboratories, Inc. have been working in close coöperation with the Bureau of Standards in the development of airplane radio equipment suitable for reception of beacon and telephone signals in the 280-360 kc. band. It was early recommended by RFL that the trailing wire type of antenna, heretofore used on planes, be abandoned, and that the receiver sensitivity be increased sufficiently to obtain the required range with a rigid vertical antenna permanently affixed to the plane. At the time of this recommendation it was not known whether the level of ignition noise could be reduced sufficiently to permit the use of a receiver of the requisite sensitivity, but recent experience has demonstrated that it can. The radio receiver herein described marks a real advance in aircraft radio technique. It is so sensitive that the necessity for the trailing wire antenna is entirely eliminated.

The trailing wire antenna has many obvious disadvantages: it is awkward for a pilot to reel in and out, is a positive hazard to planes flying in close formation, and is responsible for many falling lead weights. The reel required for this type antenna is heavy and bulky. If forced down the pilot has definitely lost his antenna unless he wishes to get out of the plane and drag the wire out horizontally; even this might be difficult in some instances. Finally, in receiving signals from a beacon of the crossed-coil type, a horizontal component of electric field is always picked up by a trailing wire antenna because the wire will not hang vertically in the wind stream. The result of this is an apparent shift in the beacon course when flying obliquely to the line of bearing which is very disturbing to the pilot. This difficulty is removed by the use of a rigid rod antenna, which is permanently fixed in the plane, approximately vertical to the ground when the plane is in horizontal flight.

In addition to requiring extreme sensitivity in the receiver, the rod type antenna imposes severe demands on the ignition shielding of the plane. Not only must the high tension leads, magnetos, and low tension wiring be thoroughly covered with grounded braid or armour, but the ends of the spark plugs must be so enclosed that there is no break in the shielding from cylinder block to magneto. At least one manufacturer of spark-plugs (the B. G. Corporation) has been enterprising enough to develop and place upon the market a completely metal-clad and adequately shielded plug which considerably facilitates the installation of shielding. It appears that complete elimination of ignition disturbance even for a receiver of the high sensitivity above described may definitely be realized if proper care is applied in the routine shielding and a shielded spark plug or its equivalent is employed. The extra expense entailed by this complete job of shielding over the conventional rather incomplete method is trivial.

Fig. 1 shows a Pitcairn "Mailwing" biplane used in the U. S. Mail Service equipped with the rigid rod antenna, and Fig. 2 shows the method of installing the radio receiver, control panels and visual reed box in the plane. Fig. 3 is a photograph of the recently developed receiving equipment which has sufficient sensitivity to make possible the use of a rigid rod as the collector. Fig. 4 shows the receiver alone with the hinged cover over the tube compartment opened to permit installation of new tubes. The receiver, once aligned for a particular length of antenna rod, has a

(*Continued on next page*)

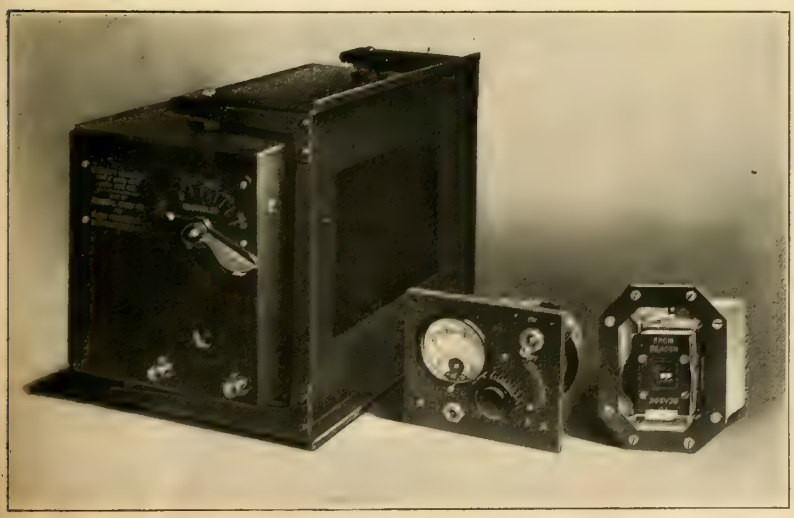


Fig. 3. Recently developed aircraft radio receiving equipment.

(*Continued from preceding page*)

single tuning control conveniently shaped to permit manipulation by the pilot even though wearing heavy gloves. A direct frequency calibration in kilocycles is engraved on the face of the receiver about this tuning control. Signal intensity is adjusted by means of a knob on the control panel. (See Fig. 3.) This panel is mounted on the dash of the plane, and carries, in addition to the volume control, a filament switch and a two-range voltmeter for checking the condition of the plate and filament batteries. When flying a beacon course, the pilot leaves the tuning fixed and merely controls the intensity from time to time as desired. A shock-proof reed box holder and set of reeds is also shown in Fig. 3. The reeds are optional equipment with the receiver; their development and use is fully explained in an earlier reference[2]. A special "B" battery with appropriate terminal voltages for the receiver has been developed and manufactured by the National Carbon Company at the suggestion of R.F.L.

The receiver is doubly insulated from shock by sponge rubber: the case of the receiver is held by metal caps and sponge rubber discs from a mounting rigidly fixed to the plane; and a metal girder bearing the tubes is insulated as a whole from the case by sponge rubber. Unless a particularly microphonic tube is used by mistake, a negligible noise is heard in the telephones even though the mounting frame of the receiver is struck violently. Periodic forced vibration from the plane is thoroughly eliminated by these rubber couplings. The receiver employs five tubes: two radio-frequency amplifiers of the screen-grid tetrode type; high mu tubes for detector and first audio stage, and a power tube for the second audio stage. These tubes are furnished to the radio trade by R.C.A. as types 222, 240 and 112-A respectively. There are three tuned circuits operated by a single control. The high sensitivity of the receiver may be judged from the fact that it will produce an audio output of 15 volts across 5000 ohms in the plate of the power tube for a 30% modulated radio frequency input of but 5 millionths of a volt. It is this extreme sensitivity, heretofore unattained in any single control aircraft receiver, which makes possible the use of a short rigid rod as antenna. The importance of the single control feature for airplane use need scarcely be emphasized.

The receiver, shock mounting, and reed holder are made of aluminum.

In almost all instances the plane will carry a storage battery for panel lights or for landing lights. This battery may be used for the filament supply of the radio receiver. The total weight of the receiving equipment including antenna and reeds is approximately 30 pounds.

The receiver has been tested extensively in flight. The first tests were made at College Park, Maryland, about six months ago. Using the normal antenna, consisting of a duraluminum tube one inch in diameter and projecting about six feet above the fuselage of the plane, beacon signals from Bellefonte, Pa., 140 miles away, were easily heard 10 feet from the telephones. This test was made with the plane on the ground and the engine shut off; in flight incomplete ignition shielding of this particular plane prevented utilizing the full sensitivity of the receiver. Flight tests have been made at Dayton in a trimotored Fokker, and at Dearborn in a trimotored Ford plane. In both cases the ignition noise-level was high, due to inadequate shielding of the spark plugs; nevertheless even with the reduced sensitivity at which it was necessary to operate, the RFL receiver considerably exceeded the performance of other receivers with which it was compared. With an antenna consisting of a fifteen foot vertical wire this receiver installed at the Ford Beacon station at Dearborn was able to produce a readable signal from a Ford Beacon at Chicago through heavy atmospherics. This distance is approximately 250 miles.

The most convincing demonstration of the performance of the receiver was obtained on Pitcairn Mailwing PA-5 whose ignition system had been carefully shielded by the Bureau of Standards. With this shielding the receiver could be adjusted to full sensitivity without invoking more than the faintest background of ignition noise. Figure 1 shows the six foot pole antenna on the Pitcairn craft. With this equipment normal operating amplitude of the reeds was obtained at Hadley Field, N. J., from the experimental beacon of the Bureau of Standards installed at College Park, Maryland, a distance of approximately 180 miles. At the time of this reception the transmitter was supplying only 5 amperes to each loop. The two loops are triangular in shape, 70 feet high and 300 feet along the base. With such a modest power in the transmitter and a six foot rod for a receiving antenna, the working range of the receiver is therefore at least 200 miles with reed indicators, and probably considerably greater if head telephones are used.

While originally designed for the beacon and weather service in the 285-350 kc. band, the RFL receiver may be readily modified to cover other frequency bands. Experiments have proceeded in this direction up to 6,000 kc. (50 meters). The sensitivity falls off, of course, at the higher frequencies.

The first radio equipment of this type for the mail planes of Pitcairn and of the National Air Transport, for Ford, and also for the Signal Corps of the U. S. Army, were manufactured by the General Radio Company of Cambridge, Mass., and by the Stromberg-Carlson Telephone Mfg. Co. of Rochester, N. Y., licensees of the Radio Frequency Laboratories, Inc. of Boonton, New Jersey.

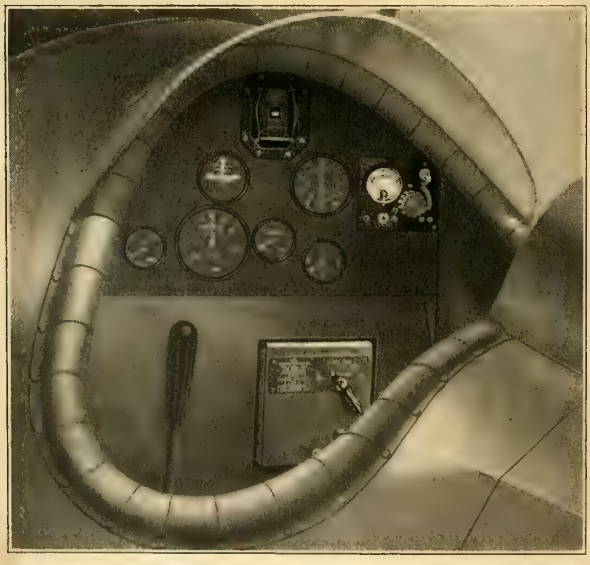


Fig. 2. Method of installing radio receiver.

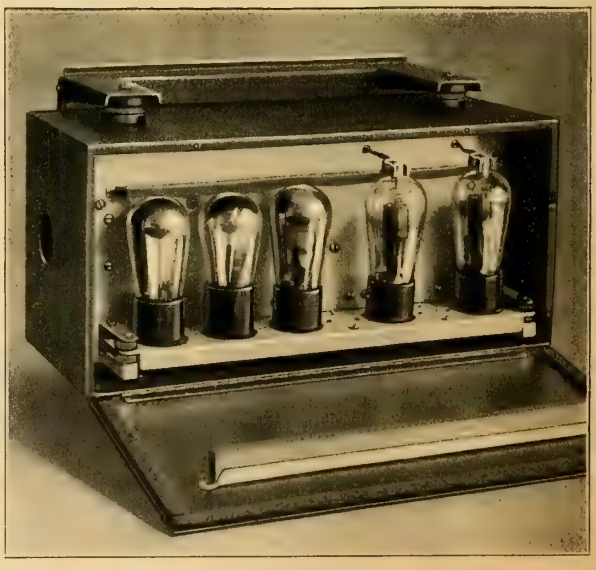
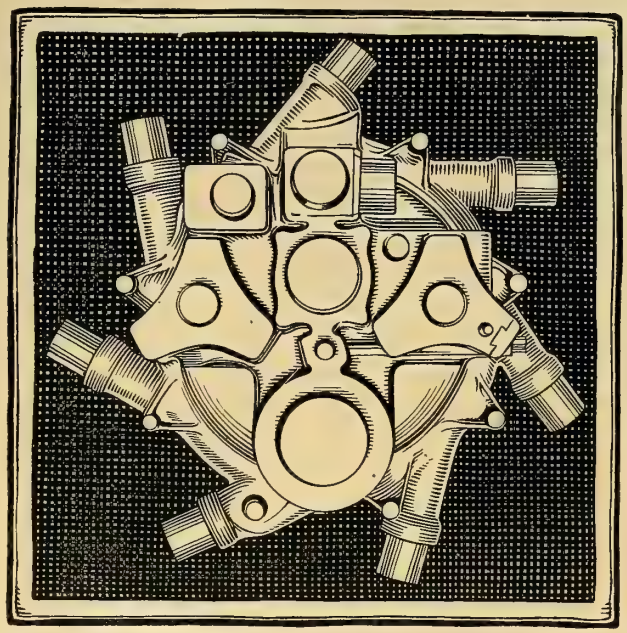


Fig. 4. Receiver alone, showing tube mounting.

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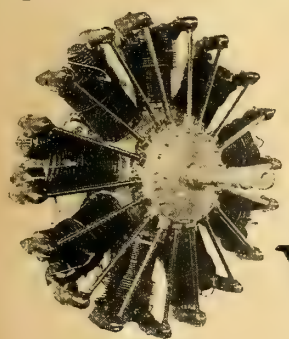


BEFORE engineering ideas represented by a blueprint can be reduced to tangible form—before the metals can be poured which give the engine its light weight and enduring strength—patterns for each casting must be carefully made. Patterns on which will depend the form of the casting—the accuracy of its weight and dimensions—the very success of the engine itself!

Behind the perfection exemplified in Wright patterns, stand long years of training and experience—years that have resulted in a thorough knowledge of the trade.

It is that knowledge that guides the tools of Wright craftsmen, modeling intricate designs in wax and clay, perpetuating them in wood and metal. With skillful precision allowance is made for the contraction of the cooling metal—provision is made for the surplus to be later removed in machining—every part so formed that the resulting mould or core may have adequate strength to withstand the flow of molten metal.

Time taking, costly work...but time and cost can not be considered in attaining and maintaining Wright standards—standards paralleled only by Wright performance.



Wright "Cyclone" Aeronautical Engine

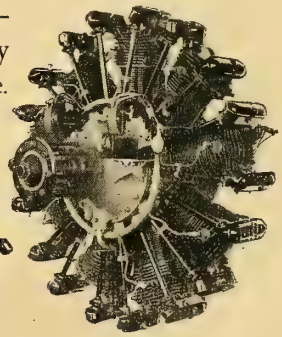
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AIR RACES and SHOW AT LOS ANGELES

By Francis D. Walton

CONCEIVED on the California scale of "Biggest and Best", executed with that expert showmanship for which Hollywood is world famous and supported by that typically ideal weather, about which every Californian modestly feels that the more said the better, the combined Aeronautical Exposition and the National Air Races of 1928 were held at Los Angeles during the second two weeks of September with a degree of success which was nothing short of phenomenal.

In the matter of size, no question ever can be raised against the claim of the California Air Race Association, sponsors of the meet, that nothing of its kind ever had been accomplished before in aeronautics. Success was in no sense an inevitable result of the Los Angeles undertaking. The opening days of the show gave no indication that Success had a reservation for the duration of the meet. It came rather through the unremitting effort and toil of the host of sponsors and workers of the association, but when it did put in an appearance it was there to stay. It can be said authoritatively that Los Angeles takes a place in the select company of Spokane as one of the cities which has succeeded in making money out of an air show.

If the Los Angeles achievement was accomplished mainly through the employment of expert scrutinizers of free passes and the sometime painful conversion of badge wearers, who were under the impression that any old badge would get them into everything free, into a bumper crop of cash customers, there were few dissenters from the general opinion that the show was well worth the money.

It was a complete revelation to the many men in aviation who were at Los Angeles that such large crowds as those that went daily to Mines Field (and let us remind those who were there before we forget it that no matter what the taximeter said the field is very near Los Angeles) could be kept constantly amused and entertained watching ships in flight. The crowds, averaging 25,000 to 30,000 daily, came early and stayed late.

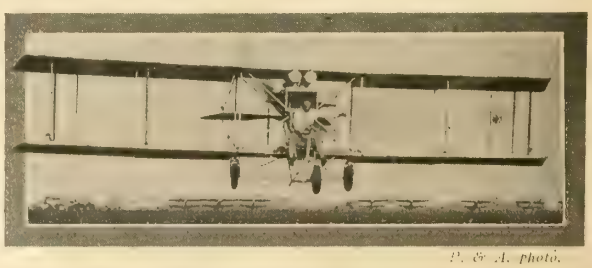
Three things contributed mainly to the success. The participation of the army and navy and their trifle desperate and somewhat collegiate inter-service rivalry, the cross-country air races and the exposition.

The novelty of holding an aircraft exposition in connection with the national air races proved thoroughly practical, and the fact that the meet had been underway only two days when members of the manufacturers' section of the Aeronautical Chamber of Commerce were in indignant meeting on the subjects of the "goings on" on the racing side of the fence had little or nothing to do with the joint holding of meet and exposition, but a great deal to do with the fact that the army and navy rivalry temporarily had gotten out of bounds.

There were some two hundred odd aircraft, aircraft engine, and accessories manufacturers and distributors represented in the hall. To say that the crowd that paid special admission to get into the grandstands to see the racers was much greater than that which toured the hall seems to this writer to be merely the utterance of the axiomatic. But the crowds prowling through the hall at certain hours were sufficiently large to warm the cockles of the heart of any hopeful retailer of spark plugs, goggles, air mail souvenirs, or trimotored, twelve-passenger ships.

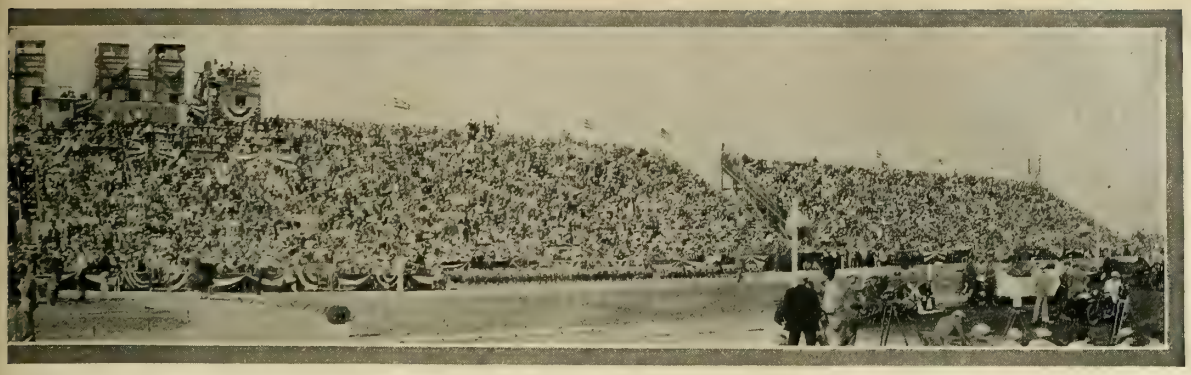
It is true that the preponderance of the exhibits had a distinctly western flavor, but, if memory serves correctly, Los Angeles, her commercial and civic aspirations to the contrary notwithstanding, is still on the Pacific coast, and therefore the western note was not only natural but in a degree inevitable. As to the character and nature of these predominantly western exhibits, it can be said, it seems more or less truthfully, that they also make airplanes in the west.

The tone of the exposition setting was every bit as important as the exhibits themselves. In the great flag-draped exposition hall there prevailed continuously a gala holiday note which was closely associated with the successful circus, bazaar or fair. It was a healthy tone but not a pretentious one. There was no effort made to give this aircraft exposition a platinum setting of the sort which resembles the still-life fixings of the average automobile show. It is the hope of this writer that aviation never attains that stiff dignity, but whether it will, or will not, or whether it de-



P. & A. photo.

Al Wilson flying a modern replica of 1910 Curtiss pusher with which he performed at the Los Angeles Air Meet.



serves such a fate, is outside the present situation. In a word the Los Angeles setting was in every sense appropriate to the present status of the new business of flying.

The 200,000 square feet of exposition space was not so greatly crowded with the exhibits of accessories as to cramp the space given to actual aircraft exhibits. There were thirty-eight planes on view on the floor, and ample opportunity presented by the exhibitors for the ever-curious public to inspect, at as close a range as they desired, ships that could actually fly. While this investigator saw none of these planes labeled with the alluring title the "Ship you Love to Touch" (an idea for aircraft expositions that is hereby patented), there seemed to be a mass consciousness among the exhibitors that the greatest amount of good could be obtained along the line of developing air-mindedness by allowing the always curious laity to touch, finger and fool with all the exhibits they wished. There was certainly a minimum number of "Don't Touch" signs.

The ship exhibits included planes in every classification of power and size imaginable. But while there was invariably a pleasing amount of awe expressed by persons standing in front of the tiny ships, it was in the large passenger cabin planes that the greatest interest was displayed.

The Maddux Air Lines exhibited a trimotored Ford, one of its fleet of seven ships now in operation on the Pacific Coast. There was always a large crowd in the act of inspecting this plane as there was at the Western Air Express exhibit space where there was displayed one of the Fokker F-10 ships, a purchase under the equipment fund loan of the Daniel Guggenheim Fund for planes for the model passenger airway between Los Angeles and San Francisco.

Supporting the Ford in the exhibits in what now seems like the age-old controversy between metal and fabric and wood construction was the Prudden all-metal monoplane. The innovation in this exhibit was the fact that the plane shown was the Prudden powered with the Pratt and Whitney Wasp. Also in the all-metal group was the Thaden monoplane, which was flown down from San Francisco to the exhibit.

The exposition was the occasion of the maiden appearance of the Thaden plane with its induced drag feature in the form of wing flaps. The Thaden is a three-place ship. The specifications and performance figures given to one and all who so much as dared to pause before the exhibit give this plane a high speed of 120 miles an hour and a cruising speed of ninety-six miles an hour. Its power unit is a Comet engine.

There was a conspicuous absence of military planes in the show. The only ship having anything approaching full claim to the military was a Vought Corsair, flown to the Pacific coast for exhibition by Stephen McClelland, of the Pratt and Whitney Company. The plane is the "office ship" of the Hartford firm, and represented rather the Vought claim in the commercial field than in the military.

The Douglas Company exhibit tended toward the military, it is true, and most of the space allotted to this company was given over to an unfinished Douglas 02H, a Liberty-motored Air Corps observation plane. There was also a direct tie-up between the Keystone Company's exhibit in the hall and the fact that there was a full squadron of Keystone bombers on the field, the first to make a transcontinental flight.

Another ship which was flown cross-country for exhibit in the show was a Wright-engined Fairchild folding wing monoplane. This ship was exhibited by the American Aircraft Company, a Los Angeles distributing concern. The Fairchild ship, with one wing folded back, attracted much interest in the B section of the hall. Other exhibitors in this section were the Aeromarine Klemm Company, Consolidated Instruments, the Russell Parachute, and the Rankin Flying School.

Prominent in the A section of the hall was the Bach Aircraft exhibit. The center of this display was one of the new Bach air transports, a three-engined monoplane, the three engines delivering a total of 710 horsepower. The matched wood cabin has a unique ventilating system and other conveniences that seemed to take the fancy of the inspecting public. Other exhibitors who had space in section A were the Airport Engineering Company, the Austin Company, the Adams Aerial Transport, the Ethyl Gasoline Corporation, Curtiss-Robertson, and the Federal Aircraft Company.

The last named company had for exhibit its newest creation, a two-place cabin monoplane with an all-steel wing. This plane has a 39-foot 10-inch wing span, an overall length of 25 feet 9 inches, a height of 7 feet 10 inches. Powered with a Hallett nine-cylinder engine developing 130 horsepower, a high speed of 115 miles an hour and a cruising speed of 100 miles was claimed for the plane.

Both nationally known and smaller western manufactur-

(*Continued on page 726*)



Haldeman photo.

The Navy NB-2 Squadron in formation

LESSONS from the 1928 NATIONAL AIR RACES

THE National Air Races of 1928 at Mines Field, Los Angeles, during the second and third week of September, have so recently passed into history that a just appraisal of what they accomplished for aviation is not easy and may be impossible at this time. It is quite the custom in this fast changing period of aviation when it has grown from an infant to a giant industry and an important factor in our economic and social life to err, either in overmuch enthusiasm or on the other side—in a lack of appreciation for what has been accomplished. It is not the part of this writer to praise too copiously or to condemn, yet it is possible to recapitulate roughly the show itself, the races at Mines Field and the cross-country derbies in an effort to emphasize some of the things that can be learned from them.

Whatever those who planned the first national air races believed would be the evolution of flying, the actual trend of the event itself was made manifest clearly enough this year. The public is more interested than ever before in the transportation systems promised for the future by the airplane.

The cross-country events, the transcontinental derbies from Roosevelt Field, the races from San Francisco and the international derby from Windsor, Ontario, were the star parts on the program. These races over forest and prairie, over mountain and desert, focused the attention of millions on flying and the thousands that gathered at Mines Field came especially to see the finish of these cross-country races rather than the remarkable displays put on by the service fliers or the closed course races.

After all, nothing is more natural than that the men and women of our country—and equally or more important, the boys and girls—should be thrilled more by the graphic illustration of "going some place" found in the cross-country flights. Those who were fortunate enough to get to Mines Field saw the most remarkable display of massed stunt flying ever put on in this country. They liked it, were fascinated by it, and went home feeling as they never had before that the Army and Navy Air Services merited the support of every patriotic American. Their biggest kick, however, if crowds and gate receipts and newspaper headlines mean anything, came when the little Cessna monoplane piloted by Earl Rowland crossed the finish line; when Ed Ballough and Grandpa Dickinson swooped out of the sky in the Laird and when Art Goebel in his white Lockheed swung over the field. The fact that Art had been forced to land didn't lessen the enthusiasm of his reception. The crowd sensed a bigger thing even than the winning of a non-stop race from New York. They were privileged to see with their own eyes pilots and machines that had crossed the continent of North America in less than a full day of actual flying time and it meant to them that the most important mission of the airplane was actually being accomplished—the conquest of space and time.

The lesson in this is easy to read. Next year's air races will be planned with greater emphasis than ever on the cross-country features. The airplane manufacturers, the pilots, the engine builders, the oil and gasoline companies, the managers of airports along the routes, the meteorological service, the committees charged with clearing the pilots in and out of the control stops will prepare as they did not this year for the cross-country races and in that preparation improvements all along the line will be made that will send aviation still further on the road to its manifest destiny in the United States.

In connection with the work as it was done let it be said that hind sight is always better than foresight. The men who laid the plans, who started the races, the fields that serviced the ships and those charged with making the weather observations and gathering the reports all did a remarkable job, but it is perfectly possible to do a better one and when, instead of for a race, fifty planes are westbound on commercial affairs—or a hundred—or two hundred—with as many more bound east and south and north, all facilities must be far better than they were for the derbies. There is not a mechanic at any one of the control stops that did not learn something from the cross-country races that will be useful to future commercial flying.

One specific instance may be recalled to emphasize the need for greater public support for our splendid and already overworked weather service. When the Class B race started from Roosevelt Field weather data had been secured for part of the way but owing to the carelessness of one or two men, which has not yet been explained away, an inaccurate report of weather conditions at McKeesport, Pa., was given to the fliers. Lieutenant H. B. Clark at Roosevelt Field was informed that the weather at McKeesport was good. After twenty planes had gotten away a call to McKeesport informed Roosevelt Field that the weather there was anything but good. The second report happened to be right unfortunately but it was too late then. Clark attempted to assume all the blame for the blunder but he could not attend to everything personally. More weather reports, more observers and better facilities for handling them is the lesson in this incident.

A number of pilots and manufacturers feel that the refusal of the race commit-

(Continued on page 727)



Haldeman photo.

A Marine Corps Curtiss OC-2 observation plane in a vertical bank close to the ground, illustrating one of the typical daring maneuvers at the National Air Races.



WACO WINS AGAIN

—taking first prizes in the season's major events

Winning Sweepstakes with best time from New York to Los Angeles.

Placing first in Class B Transcontinental Air Derby, Whirlwind Class, between New York and Los Angeles.

Winning the International Race from Windsor, Canada, to Los Angeles.

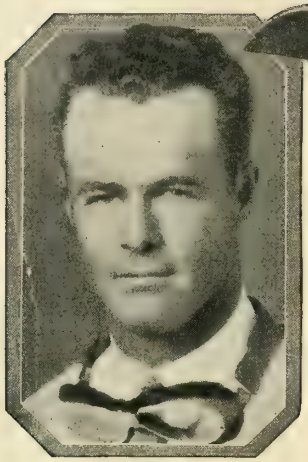
First in National Air Tour by a margin of over 3,000 points.

These victories again demonstrate the same quality of performance which in the last seven years has been responsible for Waco's leading position in the industry.

WACO AIRPLANES

The Advance Aircraft Co., Troy, Ohio

Rowland wins





YOUR skill and daring, Earl Rowland, have placed your name in the front rank of aviation's "Hall of Fame." We are proud of you, and proud, too, of the fact that you chose a Cessna plane to help you win.

You have proven to the world what we have long contended—that the Cessna Cantilever Cabin Monoplane will out-fly any other cabin plane ever built—horse-power for horse-power.

Not once, but twice have you proven this fact—first, in winning the Class A, Cross-Country Derby, and, second, in winning the Closed Course Event No. 2 at Los Angeles. You are doubly entitled to our congratulations, and we are indeed happy to have had our share in your triumphs.



The Cessna Air

Wichita,

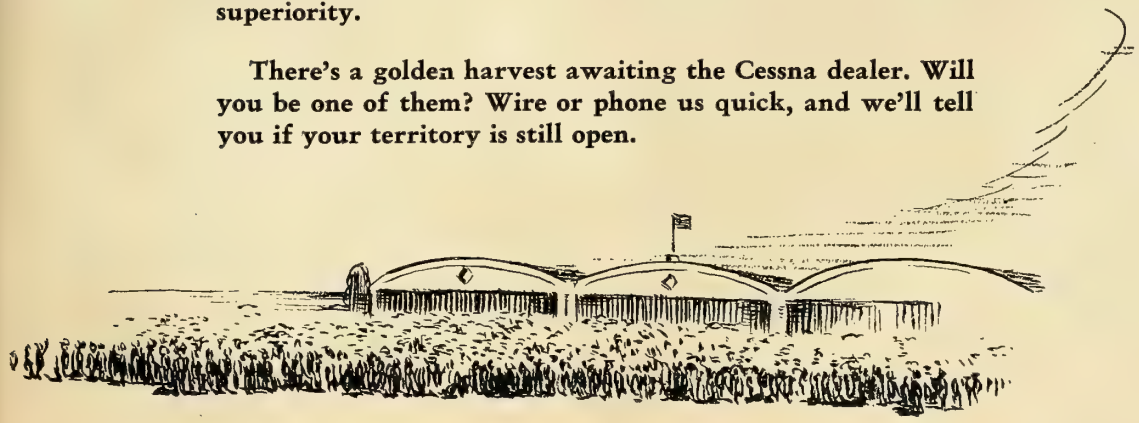
with a CESSNA

WHEREVER the air-minded gather, one name is heard on every hand — CESSNA! Already orders are pouring into the factory for duplicates of the plane in which Rowland flew to success.

This product of the old master, Clyde V. Cessna, bids fair to be in the greatest demand of any airplane ever manufactured. The plane that Rowland flew was a strictly stock model—no clipped or racing wings, or other special features — but the same plane that we have been delivering everywhere in the country for many months past.

Don't forget, either, that in Class B, the Cessna, piloted by Schultz, was the *first strictly commercial plane of any type* to cross the line at Mines Field—again proving Cessna superiority.

There's a golden harvest awaiting the Cessna dealer. Will you be one of them? Wire or phone us quick, and we'll tell you if your territory is still open.



craft Company

Kansas

AIR RACES AND SHOW AT LOS ANGELES

(Continued from page 721)

ers of aircraft engines were represented in the hall. These included the Wright Aeronautical Corporation's exhibit, the Curtiss Aeroplane and Motor Company, and the Pratt and Whitney. Most of the west coast engine entries were small powered motors, and many interesting engine innovations were noted in these newer and smaller designs.

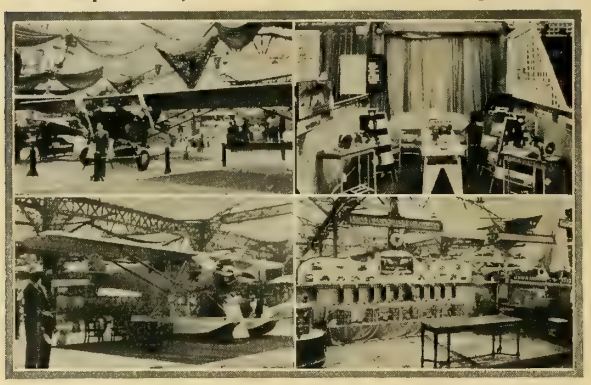
The Wright exhibit consisted of two Whirlwinds, and a Cyclone The Pratt and Whitney exhibit, just across the aisle, also was built around two engines, a Hornet and a Wasp.

There was no straining in any of the exhibits to introduce the historic note in the Los Angeles show. The featuring of the old in an effort for striking effect was conspicuously absent. The Travel Air exhibit did feature the historic note somewhat in the display of Colonel Arthur Goebel's *Woolaroc,* but the manner of presentation was highly appropriate. Supporting the *Woolaroc,* were two of the latest Travel Airs.

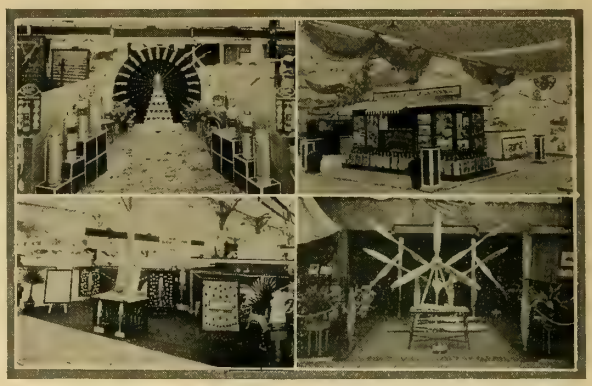
The outstanding historic note in the exposition, and adjoining that of the Travel Air, was a French war plane, the late Captain Charles Nungesser's Hanriot fighting biplane.

All in all there was plenty to see, in one way or another at Mines Field (Cy Caldwell, that great observer of things aeronautical, said that in one aisle of the exposition hall alone, on a cool September evening, he counted seventy-six pairs of feminine limbs engaged valiantly in the effort to establish the no-stocking fad) and it seems that the justified protest of the exhibitors against the frequent and somewhat unnecessary crashes nevertheless did not materially detract from the benefits of the show. Did somebody say something about Cleveland?

Joseph Kreutzer, Inc. | American Bosch Magneto Co.



Pyrene Mfg. Co. | Standard Oil Co. of Calif.



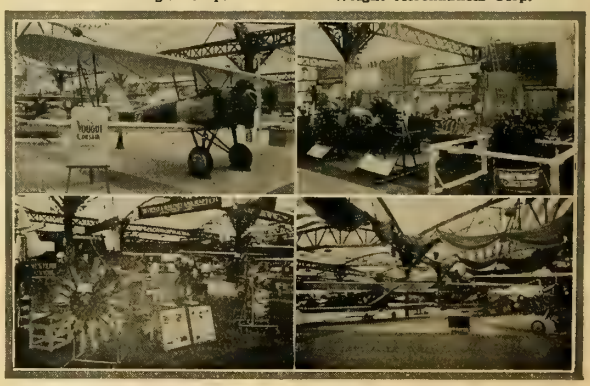
B. F. Mahoney Aircraft Corp. | Texas Pacific Coal & Oil Co.

Champion Spark Plug Co. | Standard Steel Propeller Co.

Ryan Aeronautical Corp. | Ex-Cell-O Tool & Mfg. Co.



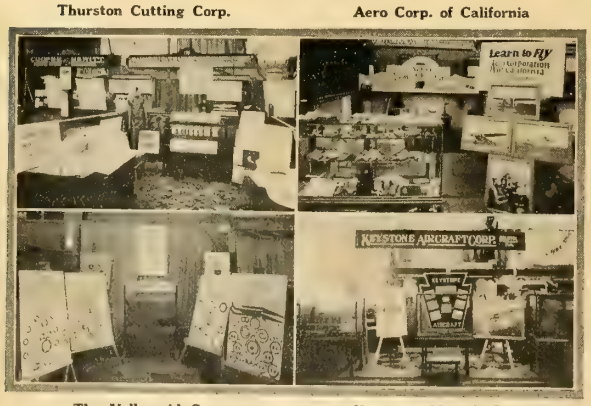
Chance Vought Corp. | Wright Aeronautical Corp.



Strauss & Buegeleisen | Russell Manufacturing Co.

Pratt & Whitney Aircraft Co. | American Eagle Aircraft Corp.

Thurston Cutting Corp. | Aero Corp. of California



Robert Bosch Magneto Co., Inc. | Aero Supply Mfg. Co.



The Vellumoid Co. | Keystone Aircraft Corp.

Rand McNally & Co | Consolidated Instrument Co.

A FEW OF THE EXHIBITION BOOTHS AT THE CALIFORNIA AIR RACES

LESSONS FROM THE 1928 AIR RACES

(Continued from page 722)

tee to consider valid the protests entered against the Lairds and Wacos in the Class B derby was unfair. They point to the rules requiring that the planes in the race be duly licensed as commercial craft and charge that these planes did not come under the regulations. It is hard to see how the committee could have ruled otherwise than it did under the circumstances, the rules governing the race being worded as they were. Next year perhaps a more thorough definition of the entrance regulations may prevent such misunderstanding.

There is this to say for the decision of the contest committee. The rules must be broad if the best interests of aviation are to be served. History is merely repeating itself. In the evolution of the automobile, the racing car of one year became the stock car the next. The jobs put out by Mattie Laird and the Advance Aircraft Company may not look like commercial ships this year but it is likely that in another year or two even they will be out of date. This way progress lies. Ships especially built for the "stock plane races", however, should be barred if, in the effort to make a fast machine, less emphasis rather than more, is placed on the factors of safety. Speed and lift without due regard for safety do not spell efficiency.

The one fatal accident that marred the air races and the other accident that might have been fatal brought forth numerous critical comments, most of them "not for publication". The AERO DIGEST,

(Continued on page 851)

H. C. Lippiatt | Aluminum Co. of America



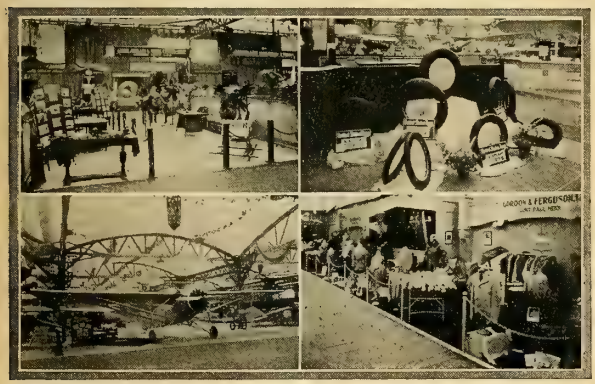
Pacific Goodrich Rubber Co. | John A. Roebling's Sons Co.

California School of Aeronautics | Scintilla Magneto Co.



Eclipse Machine Co. | Kendall Refining Co.

Kinner Airplane & Motor Corp. | U. S. Rubber Company



Prudden-San Diego Airplane Co. | Gordon & Ferguson, Inc.

National Steel Products Co. | Haskelite Mfg. Co.



Pacific Aeromotive Corp. | Maddux Air Lines

E. B. Meyrowitz, Inc. | O. E. Szekely Corp.



Irving Air Chute Co., Inc. | General Electric Co.

A. G. Spalding & Bros. | Follmer-Clogg Co.



General Electric Co. | Nicholas-Beazley Airplane Co.

SOME DISPLAYS AT THE CALIFORNIA AIR RACE EXHIBIT

START of the TRANSCONTINENTAL AIR RACES

By Captain Stephen D. Day

YEARS ago it was customary to start an Air Race by going out to the flying field with a flag, asking the boys if they were ready, and taking the time of departure by the watch that was handiest.

The game has changed since those casual days. The stakes are bigger; the entry lists grow from year to year; engines are more reliable; and pilots know to a fine point just what their equipment is capable of.

Not only are the cash prizes for the pilots much larger, but the aircraft manufacturer who enters the air racing arena is playing for the highest stakes of all—success for his business. Make no mistake about it—the races the manufacturer wins in 1928 will show up favorably in his balance sheet in 1929.

Handling the start of the Transcontinental Air Races for 1928 developed into a man sized job and kept the starting committee working night and day for a month.

The committee was made up as follows: Stephen D. Day chairman; Henry Boynton and B. L. Orde, aides; George M. Townsend, starter; William A. Rogers and George B. Post, assistant starters; Talbot O. Freeman, timer; Sidney Bowen and John J. White, assistant timers; James B. Taylor, Jr., referee; Frank L. Tallman, Jr., clerk of the course; Harry Booth, George McLaughlin and Hubert Huntington, technical; Hugh C. O'Reilly, ballast and weighing; H. B. Clarke and Lieutenant Max Balfour, operations and grounds.

Four events were flown this year. The derby was divided into three stock races, classified by cubic inch piston displacement of engine:

Class A—open to all type ships powered with motors of 510 cubic inch displacement or less.

Class B—open to all type ships powered with motors of more than 510 cubic inch displacement, but not to exceed 800 cubic inch displacement.

Class C—open to all type ships powered with motors of more than 800 cubic inch displacement.

The fourth and last event was the Transcontinental Non-stop Race.

Roosevelt field was selected once more as being the best and safest field available for the starts. In all, seventy planes of varying types were sent off without mishap or delay of any kind, with the single exception of the *Columbia,* which folded up her left landing wheel and ground looped off the runway. No damage was done, and after a new wheel had been fitted on, she got away to a beautiful take-off.

Through the coöperation of Mitchel Field and the Weather Bureau at Hadley Field, we were getting weather reports every hour, so when good weather had been reported through the Alleghanies we were ready to send off Class A as per schedule. The official take-off time set for this class was 6 a. m., Eastern Standard Time.

Thirty-seven planes were lined up in formation as shown below:

TTTTTTTTTTTT
TTTTTTTTTTT
TTTTTTTTTTT

Lieutenant Balfour, Henry Boynton, Bert Orde and a detail of enlisted men from Mitchel Field handled this work efficiently.

Henry Booth, George McLaughlin and Hubert Huntington had inspected all the planes in this class, and Mr. Booth had drawn up a detailed Master Record Chart of the entries, which proved a necessity we could not have done without.

Although we were ready to get the planes off promptly on the minute, we waited almost forty-five minutes for daylight to come.

Our method of starting was to give each pilot a warning flag thirty seconds before take-off. The starting flag was to follow, with an exact sixty seconds between time of take-off of each plane. We had selected Longines to time all our starts and had all watches synchronized with my own and the chief timer's watch. Assistant starters worked down the line getting each pilot prepared so that no delay would occur during the getaway. At six-fifteen, Eastern Standard Time, Mayor Cryer of Los Angeles called up on long distance and held the wire open in order officially to start the first plane off in the great derby.

At six hours, forty-three minutes, forty-five seconds, George Townsend, official starter, dropped the flag and waved down the course Albert R. Jacobs, race number 17, flying a Waco-10.

Thereafter with the precision of clockwork the whole class took off, L. C. Derryberry, race number 47, flying a Travel Air, being the last to leave, at seven hours, twenty-two minutes, twenty-seven seconds.

There was not a hitch or delay of any kind—motors, men and planes were ready.

Classes B and C were scheduled to take off the following morning, September 6th, but rain and unfavorable weather over Pennsylvania held them up until the morning of the 8th.

(*Continued on next page*)



P. & A. photo.

Captain Stephen Day giving instructions to the transcontinental air race pilots



a NEW TRAVEL AIR
the KNIGHT of the DAY



HITE and Gold* from tip to tail—fully streamlined—powered with a Warner Scareb—and embodying proven Travel Air quality and workmanship throughout, this new Travel Air Biplane invites the attention of the most discriminating.

With speed a plenty, evidenced by winning over all biplanes in the gruelling class "A" New York, Los Angeles race, this new ship, selling at a popular price, fills the gap between the Travel Air OX5 and Whirlwind Biplane and is ideal for the business man, the sportsman and the student. It is the last word in open cockpit planes of this particular type.

The new edition of "The Story of Travel Air" contains full information on this and all other Travel Air models including the Cabin Monoplane, "The Limousine of the Air." This book is free upon request. Send for your copy today.

*Color optional with Standard Travel Air blue. **The new type wings shown in this illustration are optional with the conventional Travel Air wings with balanced ailerons.

Travel Air Manufacturing Co.
Wichita, Kansas
"The Standard of Aircraft Comparison"

(Continuing from preceding page)

Unlike Class A, these two classes were ballast races—the contestants in Class B being required to carry 320 pounds in passengers or ballast and in Class C, to carry 640 pounds in passengers or ballast.

Each contestant was required to weigh in on scales before the ballast committee and to carry a manifest of the number of packages carried and the weights of each; this manifest to tally with a copy of the manifest mailed to the contest committee in Los Angeles.

During the delay caused by the weather, six entries in Class B were protested by thirteen other entrants, on the ground that the planes in question were not stock jobs but were racing planes, pure and simple, and were built especially to win this event. These disputed entries were four tapered wing Wacos and two fast, new type Lairds. The committee ruled that the planes had complied with the letter of the regulations, and on advice from the contest committee in Los Angeles, suggested that all contestants fly the race and make their formal complaint to the contest committee on completion of the race. The protesting pilots withdrew their complaint on this understanding and lined up for the take-off early on the morning of September 8th.

This class comprised twenty entries. Of this number, eighteen were powered with Wright J5 Whirlwind motors, one was an Anzani and one a Curtiss C6 motor.

The line-up was straight across the field. Weather reports had come in, "all clear" across Pennsylvania—the contestants were on the leash, ready to go. At six hours, eighteen minutes, and thirty seconds, I sent off L. F. Schoenhair, race number 49, in a Buhl Airsedan. At six hours, thirty-eight minutes and thirty seconds, R. J. Merritt took the long air road westward, race number 154, flying a Ryan Brougham cabin monoplane.

When the runway was clear, we lined up Class C which was limited to four contestants—a Lockheed Vega, a Fokker Super Universal and a Fairchild, all powered with Pratt and Whitney Wasp motors, and a Cox Klemin, powered with a 400 h.p. water-cooled Liberty engine. We did not intend to send them off until 8:15, Eastern Standard Time, believing it a wise precaution to let some time elapse so as not to crowd the controls on the westward course.

The planes were ready to go when word came from Bettis Field, McKeesport, Pa., that heavy fog obscured the field, with a safe landing nearly impossible. We held Class C, but twenty planes of Class B were heading right into the soup. All we could do was to trust to the pilots' skill and resourcefulness to pull them through.

At 10:15 the fog had lifted, so I sent Cantwell off in a Lockheed Vega at ten hours, twenty-six minutes and no seconds. The three other entries were sent off at exactly one minute intervals.

Sixty-one planes had taken off to splendid starts. Our only serious danger had come from the crowds of spectators which so threatened to close in on the Class A contestants that a different story might have resulted had any plane swerved from its course down the runway.

(Continued on page 853)

COMPLETE RESULTS OF NATIONAL AIR RACES

TRANSCONTINENTAL CLASS "A" RACE

New York to Los Angeles

Finish	Pilot	Plane No.	Time	Prize*
1st	Earl Rowland	99	27:00:31	$5,000
2nd	Robert Dake and Theodore Taney	83	28:18:43	2,500
3rd	W. H. Emery, Jr.	20	28:48 28	700
4th	Theodore Kenyon	51	29:19:47	500
5th	Tex Rankin	13	29:36:29	300
6th	James S. Charles	8	30:48:50	—
7th	Eugene J. Detmer	27	31:20:00	—
8th	Louis E. Derryberry	47	31:31:56	—
9th	Warren B. Smith	18	32:57:14	—
10th	George Zinn and George Hand	35	33:06:15	—
11th	George W. Hopkins	141	34:25:13	—
12th	S. J. Wittman	67	34:33:10	—
13th	Arthur W. Killips	37	34:45:23	—
14th	Stewart Chadwick	119	35:02:14	—
15th	Samuel H. Turner	26	35:48:31	—
16th	Alfred H. Stanley and Ralph Haynes	36	35:54:08	—
17th	A. H. Kreider	93	36:05:38	—
18th	John E. Carberry	29	38:11:34	—
19th	M. E. Grevemberg	104	38:48:26	—
20th	A. K. Owen	103	38:49:56	—
21st	Sidney A. Riley, Jr.	168	40:23:46	—
22nd	Don S. Phillips	46	40:35:56	—
23rd	George W. Brill	21	44:44:06	—

* *Also, special gifts, trophies, and lap prizes.*

TRANSCONTINENTAL CLASS "B" RACE

New York to Los Angeles

Finish	Pilot	Plane No.	Time	Prize*
1st	John Livingston	95	22:56:59	$7,000
2nd	E. E. Ballough	40	23:16:24	3,500
3rd	John P. Wood	114	24:31:08	2,500
4th	Edward G. Shultz	96	24:55:08	1,000
5th	Charles W. Meyers	79	25:04:13	700
6th	L. F. Schoenhair	49	26:11:20	300



Winners of first four places in the Class A Transcontinental air race. Upper left—Rowland (Cessna). Lower right—Dake and Taney (American Moth). Lower left—Emery (Travel Air). Upper right—Kenyon (Challenger).

THE Scarab



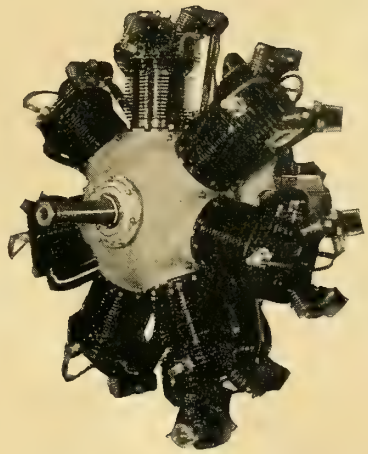
Earl Rowland and his Cessna Monoplane powered with a Warner Scarab engine which averaged 122.45 miles per hour coast to coast.

WARNER "SCARAB" ENGINES WIN

1st PLACE
2nd PLACE
3rd PLACE
4th PLACE

NEW YORK TO LOS ANGELES CLASS "A" AIR DERBY 2939 MILES

Place	Plane	Pilot	Engine	Time Hrs.	Min.	Sec.
1.	Cessna	E. Rowland	Warner "Scarab"	24	0	31
2.	AM. Moth	R. Dake	Warner "Scarab"	25	18	43
3.	Travel Air	W. H. Emery	Warner "Scarab"	25	43	43
4.	Challenger	T. Kenyon	Warner "Scarab"	26	19	17



110 H.P. 1850 R.P.M.
Approved by Dept. of Commerce

THE WARNER AIRCRAFT CORPORATION
Detroit - Michigan
U. S. A.



The three planes which completed the Class C Transcontinental race—Brooks (Fokker), Cantwell (Vega), Collyer (Fairchild).

(Continued from preceding page)

7th	T. A. Wells	106	26:12:01		—
8th	Jay Sadowsky	100	26:57:53		—
9th	Ive McKinney	110	27:47:05		—
10th	Maurice Marrs	48	29:47:13		—
11th	B. H. Shaw	186	31:42:04		—
12th	Raymond Joseph Merritt	154	33:59:32		—
13th	Matthew Whitin Whittall	41	37:05:16		—
14th	G. C. Quick	97	40:14:22		—

** Also, special gifts, trophies, and lap prizes.*

TRANSCONTINENTAL CLASS "C" RACE

New York to Los Angeles

Finish	Pilot	Plane No.	Time	Prize*
1st	Robert W. Cantwell	22	24:09:01	$5,000
2nd	Capt. C. B. D. Collyer	143	27:10:45	2,500
3rd	Edward J. Brooks	12	27:24:53	1,500

** Also, special gifts, trophies, and lap prizes.*

CALIFORNIA CLASS "A" RACE

San Francisco to Los Angeles

Finish	Pilot	Plane No.	Time	Prize*
1st	H. S. Myrhes	57	3:10:20	$1,000
2nd	Charles F. Dycer	65	3:19:20	500
3rd	Jack Frye	85	3:20:00	250
4th	Vern Roberts	92	3:25:15	150
5th	W. D. Wright	91	3:37:40	100
6th	R. Williams	187	3:44:25	—
7th	Ivan R. Olson	155	3:46:07	—
8th	Milo Campbell	178	3:56:50	—
9th	L. F. Root	115	4:02:25	—

** Also special lap prizes given by control cities along route.*

CALIFORNIA CLASS "B" RACE

Oakland to Los Angeles

Finish	Pilot	Plane No.	Time	Prize*
1st	H. C. Lippiatt	7	2:26:49	$1,250
2nd	Larry Fritz	116	2:31:18	800
3rd	D. C. Warren	66	2:31:37	500
4th	Leo Nomis	59	2:33:00	300
5th	Louis G. Meister	102	2:35:29	150
6th	Herbert Kraft	170	2:38:48	—
7th	Lee Flanigan	64	2:42:19	—
8th	Paul Richter, Jr.	86	2:49:37	—
9th	Lt. H. H. Ogden	171	3:00:47	—
10th	Jerry Andrews	105	3:03:05	—
11th	H. J. Kelsey	166	3:03:51	—

** Also special lap prizes given by control cities along route.*

INTERNATIONAL RACE

Windsor, Canada, to Los Angeles

Finish	Pilot	Plane No.	Time	Prize*
1st	William H. E. Drury	159	19:55:41	$5,000
2nd	Kenneth Whyte	31	29:50:17	2,500

** Also special lap prizes given by control cities along route.*

CLOSED COURSE EVENT NUMBER ONE

Civilian Relay Race

Finish	Team	Elapsed Time	Speed	Prize
1st	No. 1	37:37:11	79.748	$150
2nd	No. 2	37:59:19	78.975	75
3rd	No. 3	37:15:91	.....	50

Team No. 1 (Eaglerock Team) Pilot	Plane No.	*Team No. 2 (Swallow Team)* Pilot	Plane No.
J. S. Charles	248	Jeff Warren	239
Lee Flanigan	246	Chas. F. Dycer	244
Paul Richter, Jr.	245	Al Hobart	241
Harvey Bolton	247	Marion E. McKeon	243
Jack Frye (Captain)	85	Burdett D. Fuller (Capt.)	240

Team No. 3 (Individual) Pilot, L. E. Derryberry; Plane No. 47.

CLOSED COURSE EVENT NUMBER TWO

Civilian Free-for-All—510 cu. in. Class (Finals)

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize
1st	Earl Rowland	99	26:50.74	111.74	$1,200
2nd	H. S. Myrhes	57	28:06:54	106.72	600
3rd	Robert Dake	83	28:17.38	106.04	400
4th	Vern Roberts	92	29:35.64	101.37	200
5th	Lee Flanigan	63	29:58.45	100.08	100
6th	W. H. Emery	20	30:09.60	99.46	—
7th	A. H. Kreider	93	30:54.16	97.07	—

CLOSED COURSE EVENT NUMBER THREE

Civilian Free-for-All—720 cu. in. Class

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize
1st	D. C. Warren	66	24:18.75	123.39	$700
2nd	Reginald Sinclaire	43	27:15.94	110.03	400
3rd	Theodore Taney	83	27:59.15	107.19	250
4th	H. S. Myrhes	57	28:13.50	106.29	150

CLOSED COURSE EVENT NUMBER FOUR

Civilian Free-for-All—800 cu. in. Class

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize
1st	E. E. Ballough	40	33:52.78	137.82	$1,500
2nd	John P. Wood	114	34:03.96	132.09	800
3rd	John Livingston	95	34:23.95	130.81	500
4th	Chas. W. Meyers	79	34:28.33	130.54	350
5th	T. A. Wells	106	34:32.96	130.24	250
6th	Leo Nomis	59	36:05.57	124.67	100
7th	D. C. Warren	66	36:10.06	124.42	—
8th	Lee Flanigan	64	37:00.67	121.58	—
9th	Maurice Marrs	45	37:06.45	121.26	—
10th	Paul Richter, Jr.	86	37:47.40	119.07	—

CLOSED COURSE EVENT NUMBER FIVE

Civilian Free-for-All—800 cu. in. Class

SPEED:

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize
1st	Louis G. Meister	102	25:41.88	116.74	$750
2nd	Victor Dalin	54	28:39.92	104.65	450

EFFICIENCY:

Place	Pilot	Plane Number	Efficiency	Prize
1st	Victor Dalin	54	629.493	$1,200
2nd	Louis G. Meister	102	360.886	700

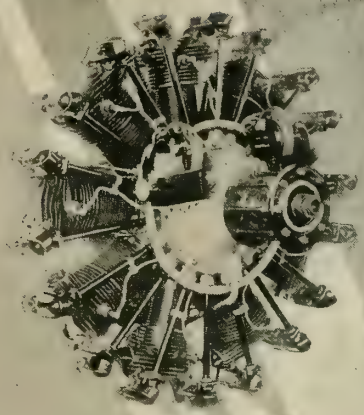
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H. S. Myrhes (Simplex Monoplane) winner Calif. Class A race.



Wright
"Cyclone"

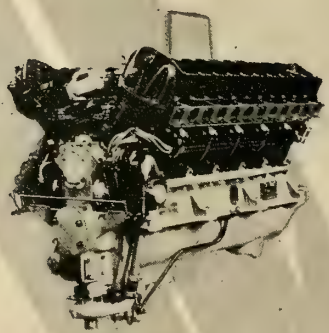


Wright
"Whirlwind"

SCINTILLA

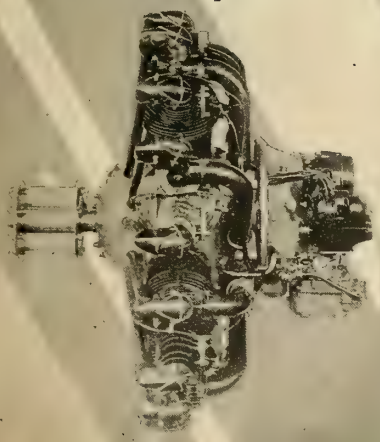
AIRCRAFT MAGNETOS

WRIGHT-PRATT & WHITNEY-CURTISS



Curtiss
"D-12"

Pratt & Whitney
"Wasp"



Pratt & Whitney
"Hornet"



SCINTILLA MAGNETO CO., Inc.
Sidney, N. Y.

(Continued from preceding page)

CLOSED COURSE EVENT NUMBER SIX
Civilians Unlimited Free-for-All

SPEED:

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize*
1st	Robert Cantwell	22	21:22.96	140.30	$800
2nd	Arthur Goebel	44	21:28.11	139.73	500
3rd	L. F. Schoenhair	49	25:25.64	117.98	200
4th	C. B. D. Collyer	143	25:28.32	117.77	——
5th	Louis G. Meister	102	25:46.79	116.37	——
6th	Jack Frye	254	27:15.43	110.06	——
7th	Victor Dalin	54	30:40.61	97.79	——
8th	Roscoe Turner	145	33:04.19	90.71	——

EFFICIENCY

Place	Pilot	Plane Number	Efficiency	Prize*
1st	Victor Dalin	54	863.232	$800
2nd	Jack Frye	254	826.432	500
3rd	L. F. Schoenhair	49	603.075	200
4th	Louis G. Meister	102	567.082	——
5th	Robert Cantwell	22	515.686	——
6th	Arthur Goebel	44	446.221	——
7th	Roscoe Turner	145	432.811	——
8th	C. B. D. Collyer	143	352.959	——

**Detroit News Trophy.*

CLOSED COURSE EVENT NUMBER SEVEN
Parachute Jump—Finals
Average Compiled on Three Days Jumping

Place	Name	Entry No.	Average Distance from Center of Circle	Prize*
1st	Geo. W. Wehling	163	66′ 9 2/3″	$350
2nd	Frank J. Garjola	161	157′ 2″	200
3rd	E. C. Lundquist	76	208′ 8″	100
4th	Harlan R. Utterback	164	211′ 4″	50
5th	Steve Walek, Jr.	75	271′ 8 2/3″	——
6th	Harry W. Booth	162	279′ 9 1/3″	——
7th	Fred W. Johnson	72	282′ 4″	——
8th	Geo. Harold Brink	71	290′ 6″	——
9th	H. L. Whitby	3	329′10″	——
10th	W. T. Dodson	69	457′ 4″	——

**Also, $100 for winning jump each day.*

CLOSED COURSE EVENT NUMBER EIGHT
Observation Type Military Plane Race

Finish	Pilot	Plane No.	Speed	Time	Prize*
1st	Lt. J. L. Kane	190	142.275	25:18.19	trophy
2nd	Lt. H. C. Fick	188	137.102	26:15.47	trophy
3rd	Lt. M. W. Ellis	189	135.876	26:29.68	trophy
4th	Lt. R. C. Young	208	133.045	27:03.50	trophy
5th	Lt. T. S. Taylor	207	132.326	27:12.34	——

**Winner, Liberty Engine Builders' Trophy.*

CLOSED COURSE EVENT NUMBER NINE
Navy Pursuit Race

Finish	Pilot	Plane No.	Speed	Time	Prize
1st	Lt. Crommelin.	12	147.77	20:18.06	trophy
2nd	Lt. E. A. Cruise	9	146.79	20:26.19	trophy
3rd	Capt. Driscoll	10	145.71	20:35.25	trophy
4th	Lt. W. Harvey.	16	144.50	20:45.62	trophy
5th	Lt. D. C. Allen	6	143.67	20:52.86	——

CLOSED COURSE EVENT NUMBER TEN
Army Pursuit Plane Race

Finish	Pilot	Plane No.	Speed	Time	Prize
1st	Lt. W. Cornelius	8	147.73	20:18.41	trophy
2nd	Lt. I. Woodring	2	147.15	20:23.16	trophy
3rd	Lt. J. Mallory.	5	143.81	20:51.61	trophy
4th	Lt. N. H. Ives	12	143.67	20:53.14	trophy
5th	Lt. R. Williams	14	143.52	20:54.16	——
6th	Lt. A. F. Roth.	13	143.13	20:57.56	——
7th	Lt. Strickland.	3	143.11	20:57.70	——
8th	Lt. K. J. Gregg	4	142.88	20:59.75	——
9th	Lt. E. Meadows	7	141.84	21:09.02	——
10th	Lt. J. Hopkins	6	140.58	21:20.39	——

CLOSED COURSE EVENT NUMBER ELEVEN
National Guard Race

Finish	Pilot	Plane No.	Speed	Elapsed Time	Prize
1st.	Lt. Brooks	192	124.88	24:02.27	$500
2nd	Lt. D. F. Kearns	1	121.67	24:39.34	300
3rd	Capt. Symons	192	117.98	25:25.57	150
4th	E. H. Robinson	175	115.25	26:01.75	50
5th	Lt. J. Allenberg	193	113.35	26:27.98	——

CLOSED COURSE EVENT NUMBER TWELVE
Military Pursuit Race

Finish	Pilot	Plane No.	Speed	Elapsed Time	Prize*
1st.	Lt. T. P. Jeter	1	172.26	20:53.85	trophy
2nd	Lt. S. A. Cruise	7	159.86	22:31.17	trophy
3rd	Lt. D. Harrigan	4	151.61	23:44.68	award
4th	Lt. S. Burrows	12	150.39	23:56.25	award
5th	Lt. Crommelin.	5	149.91	24:01.74	——
6th	Lt. T. Williams	6	146.08	24:38.57	——

**Aero Digest Trophy.*

CLOSED COURSE EVENT NUMBER FOURTEEN
National Guard, Army and Navy Reserve PT Plane Race

Finish	Pilot	Plane No.	Speed	Elapsed Time	Prize
1st	Claude Owen	5	93.82	15:59.24	$250
2nd	T. Williams	2	89.83	16:41.79	125
3rd	G. Sherwood	1	89.46	16:46.01	75
4th	C. E. Forbes	6	87.62	17:07.09	50

(Continued on next page)



Winners of first six places in the Class B Transcontinental —Livingston (Waco-10), Ballough (Laird), Wood (Waco-10), Shultz (Cessna), Meyers (Waco-10), Schoenhair (Buhl).

THE "WASP" BUHL AIRSEDAN



The "Wasp' engined Buhl Airsedan is the fourth and newest type to be added to the Buhl line of commercial airplanes. Full details of this new 8-place job which has a load of 2300 pounds will be furnished upon request.

The Buhl line of commercial cabin airplanes meets every requirement of range, load and speed. Comfortable, sound-proof, easy conversation cabins are characteristic of all Buhl Airsedans.



The Buhl Airsedan

The Buhl Airsedan is the standard plane of the Buhl line. It is powered with a Whirlwind engine and accommodates a pilot and four passengers. High speed is 120 miles per hour, cruising speed is 100 miles per hour. It has a useful load of 1628 pounds.



The Buhl Special Airsedan

The Buhl Special Airsedan is the Junior powered with a Wright Whirlwind engine. It has a high speed of 139 miles per hour and a cruising speed of 115 miles per hour. It carries a pilot and two passengers and has a useful load of 1,400 pounds. The Buhl Special Airsedan was the fastest plane in the National Reliability Tour. It made 139 miles per hour over an electrically timed course.

Full details of the Buhl line of commercial cabin planes will be sent upon request.

The Buhl Junior Airsedan is a smaller scale replica of the Standard Airsedan and is powered with a 110 H.P. Warner engine. It has a high speed of 110 miles per hour, cruising speed of 95 miles per hour and accommodates a pilot and two passengers.

DISTRIBUTORS

In the Northwest—Mamer Flying Service, Spokane, Washington
For California—Buhl Pacific Company, Los Angeles

BUHL AIRCRAFT COMPANY

Marysville, Mich.

(Continued from preceding page)

CLOSED COURSE EVENT NUMBER FIFTEEN
Light Airplane Speed and Efficiency Contest

SPEED:

Finish	Pilot	Plane No.	Speed	Time	Prize
1st	E. B. Heath	6	112.00	27:01.62	$750
2nd	Vern Roberts	92	97.16	30:52.55	375
3rd	C. A. LaJotte	88	95.14	31:31.90	250
4th	J. E. Carberry	29	93.93	31:56.19	125
5th	Gene Gabbert	260	85.92	34:54.85	——
6th	J. R. Williams	253	71.46	41:58.83	——

EFFICIENCY:

Place	Pilot	Plane No.	Efficiency	Prize
1st	John E. Carberry	29	709.693	$750
2nd	Vern Roberts	92	623.436	375
3rd	E. B. Heath	6	418.133	250
4th	Gene Gabbert	260	198.857	125
5th	Chas. A. LaJotte	88	1.518	——
6th	James R. Williams	253	1.504	——

ARMY OBSERVATION PLANE RACE
Two-Place Types

(An added attraction—no event number)

Finish	Pilot	Plane No.	Elapsed Time	Speed
1st	Lt. Barber	2	28:14.19	127.49
2nd	Lt. Goss	3	28:19.22	127.11
3rd	Lt. Walthall	8	28:23.19	126.82
4th	Lt. Coyle	1	28:28.89	126.39
5th	Lt. Bond	5	28:52.27	124.69
6th	Lt. Bobzien	7	29:16.74	122.95
7th	Lt. Little	4	29:44.23	121.06

SPECIAL EVENT NUMBER THREE
Airplane Model Building Contest

Place	Contestant	Prize
1st	David J. Evans	$150 cup
2nd	Thompson Elrod	$125 cup
3rd	Paul Channon	$100 cup
4th	Kenneth Wiley	Bronze Medal
5th	Wesley J. Cook	Bronze Medal
6th	Jerome E. Smith	Bronze Medal

SPECIAL EVENT NUMBER FOUR
Flying Model Contest

Models Under Ten Ounces

(Twenty prizes each event)

Place	Contestant	Distance
1st	Beanfield	1550.
2nd	Fox	373.4
3rd	Snyder	323.
4th	Walton	216.4
5th	Miller	207.2
6th	Chatland	134.4

Models Over Ten Ounces

1st	Endoo	487.5
2nd	Whitney	341.
3rd	Thickstunt	234.7
4th	Lippert	161.
5th	Dempster	124.6
6th	Thickstunt, J.	91.6

SPECIAL EVENT NUMBER FIVE
Marine Corps Observation Squadron Number Eight

Finish	Pilot	Plane No.	Time
1st	Michael Wodarczyk	805	23:14
2nd	Sgt. Walter L. Pounders	809	23:17
3rd	Lt. Herbert P. Becker	802	23:18
4th	Lt. Thomas J. Cushman	806	23:20
5th	Sgt. Robt. B. Ewalt	807	23:21
6th	Sgt. Harlan Hull	804	23:42

SPECIAL EVENT NUMBER SIX
Army Air Corps—Third Attack Group Race

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize*
1st	Lt. G. Acheson	138	51:36.22	139.525	trophy
2nd	Lt. H. Anderson	132	51:46.07	139.083	——
3rd	Lt. C. Robbins	134	51:46.58	139.060	——
4th	Capt. R. Wooten	129	51:57.99	138.551	——
5th	Lt. G. McHenry	131	52:25.16	137.354	——
6th	Lt. G. MacNair	139	52:25.33	137.346	——
7th	Lt. O. C. George	133	52:32.80	137.021	——
8th	Lt. W. Gross	135	52:43.90	136.540	——
9th	Capt. H. Heisen	140	52:46.63	136.423	——
10th	Lt. J. Williams	130	52:56.60	135.994	——
11th	Lt. H. Newstrom	136	53:41.46	134.101	——
12th	Maj. J. H. Jouett	128	54:55.42	131.091	——

**Winner, Mason M. Patrick Trophy.*

SPECIAL EVENT NUMBER SEVEN
Army Air Corps—First Pursuit Group Race

Finish	Pilot	Plane No.	Elapsed Time	Speed	Prize*
1st	Lt. Lawson	221	46:31.72	154.743	trophy
2nd	Lt. W. Doolittle	216	46:39.54	154.311	——
3rd	Lt. F. Robinson	222	46:55.67	153.427	——
4th	Capt. V. Strahm	211	47:01.56	153.107	——
5th	Lt. J. B. Haddon	214	47:02.78	153.041	——
6th	Lt. R. Schoenlein	223	47:02.91	153.034	——
7th	Lt. F. G. Irvin	219	47:26.96	151.743	——
8th	Lt. R. K. Stoner	215	47:42.38	150.923	——
9th	Maj. R. Royce	210	48:13.21	149.315	——
10th	Lt. F. D. Klein	220	49:36.18	145.153	——

**Winner, John L. Mitchell Trophy.*

SPECIAL EVENT NUMBER EIGHT
Navy VB2B Squadron Race

Finish	Pilot	Plane No.	Time
1st	Lt. Johnson	2B9	20:12
2nd	Lt. W. V. Davis	2B3	20:20
3rd	E. R. Peck	2B11	20:40
4th	D. C. Allen	2B5	20:47

SPECIAL EVENT NUMBER NINE
Dead Stick Landing Contest

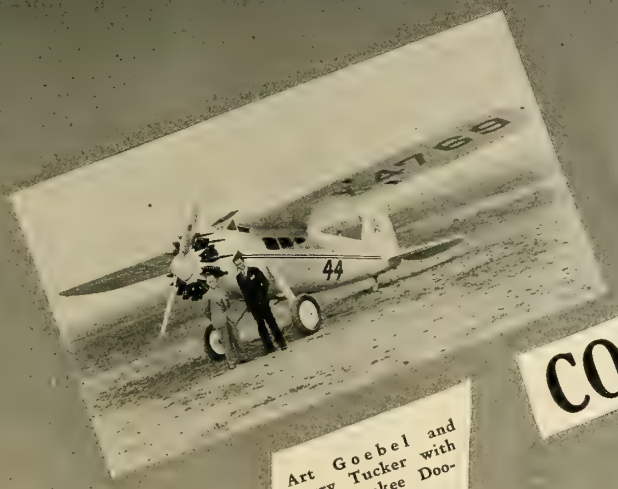
Place	Pilot	Plane No.	Distance	Prize
1st	Aeromarine Klemm	—	4′ 5″	$50
2nd	Lee Flanigan	246	14′	25
3rd	Alfred H. Stanley and Ralph Haynes	36	29′ 3″	15
4th	Arthur W. Callies	82	84′ 9″	—
5th	D. C. Warren	66	96′	—
6th	John H. Hancock	24	179′	—

AROUND-THE-WORLD FLIGHT RACE

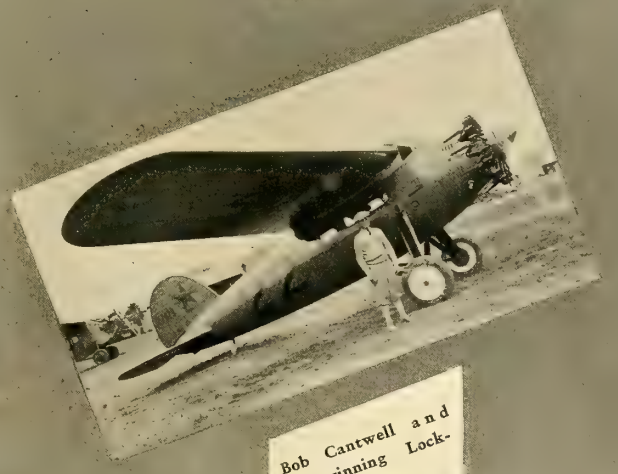
Finish	Pilot	Plane No.	Time	
1st	Lt. Herbert P. Becker	802	23:21	
2nd	Lt. Thomas J. Cushman	806	23:21	1/5
3rd	Sergt. Walter L. Pounders	809	23:26	
4th	Sergt. Robert B. Ewalt	807	23:27	
5th	Sergt. Harlan Hull	804	23:35	
6th	Michael Wodarczyk	805	23:40	



Four of the eight planes which started on the N. Y. to Los Angeles non-stop race. Top row, left to right: Stinson Jr. (Randolph Page); Lockheed Vega (Art Goebel); Lockheed Vega (J. P. Morris). Bottom row: Bellanca (O. C. LeBoutillier); Bellanca (Emil Burgin); Buhl (N. B. Mamer).



Art Goebel and Harry Tucker with their "Yankee Doodle."



Bob Cantwell and his winning Lockheed No. 22.

To Two Great Pilots, CONGRATULATIONS

. . . to Art Goebel (and Harry Tucker, owner-passenger) on his record non-stop flight from Los Angeles to New York in 18 hours and 58 minutes.

. . . to Bob Cantwell, winner of the Closed Course Event Number Six at the National Air Races, Los Angeles, California.

Both fliers used regular production stock model Lockheed "Wasp"—Vega Monoplanes.

LOCKHEED AIRCRAFT CO.

Burbank, California
a suburb of Los Angeles

EASTERN DISTRIBUTORS:
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PACIFIC COAST DISTRIBUTORS:
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LOS ANGELES

THE TORTOISE AT THE AIR RACES

By C. B. Allen

A SLOW fellow in fast company doesn't necessarily miss everything. Not by any means. Lots of the stuff may be over his head but at least he gets a chance to give the procession the once over as it goes past him. Take the late lamented affair at Los Angeles, for instance. It was a great opportunity for the hard-shell, plodding Unofficial Observer.

Most of the aforesaid lamenting seems to be because the show is over. A majority of the boys probably couldn't tell you yet whether the Air Extravaganza of the Age was held at Mines Field, the Ambassador Hotel, Hollywood or Hoboken. All they remember is that they Went Places and Did Things. Air meets are like that.

If you don't believe it, ask Casey Jones. He knows or at least he ought to, having been at every air meet—hot and otherwise—since the Wright Brothers put an engine in their kite and called it an airplane. Casey was at Mines Field; he landed there and reported in and he flew one lap of one race. The rest of the time he spent trying to run down a dirty rumor of competitive origin to the effect that his Curtiss Challenger motor had "blown up" on the way to the races and to explain to those who plagued him with questions that the plane in which he arrived was a R-o-b-i-n, having derived its name from the bird family and not from any overt act of Curtiss designers.

How Casey got out of his "soup and fish" long enough to get into his plane and start a race is one of the unsolved mysteries of the 1928 National Air Races. There are those who think he had his "glad rags" on beneath a pair of coveralls and that his motor sensed this about the time he was rounding the first pylon and quit cold. Where Casey really shined was as a promoter; he promoted more business for the Curtiss-Robertson Aircraft Company than it will be able to handle for the next twelve months, and, one night, when the evening was waning and the party waxing, he promoted a lovely scheme to have Lindbergh abducted by Ruth Elder. Everybody thought it was a swell idea, even Ruth, but hers was one of those passive indorsements, designed to appease the mob and still not wake the sleeping idol. Like many another "hot" suggestion, nothing came of it and Slim slept on in blissful ignorance of the adventure that had passed him by.

But Slim had other adventures to console him for not being kidnaped by Ruth. Army-trained, he seemed to get a real "kick" out of seeing the Navy flabbergasted when he volunteered to take the place of Lieut. J. J. Williams in the "Three Musketeers" stunt flying team that vied so tragically with Mr. Wilbur's "Sea Hawks" during the first days of the meet. Ordinarily harassed by crowds wherever he goes in ordinary attire, he sighed with relief when accosted by a friend who found him in greasy overalls and admitted he was having a "swell time" because nobody recognized him "in this get up".

The recruiting of Lindbergh by the Army to help out its aerial activities was a master stroke of genius—or luck—and left the Navy strategists "lashed to the mast". Uncle Sam's aquatic airmen believed, and do yet, that they had outflown their khaki-clad rivals in "putting on a show" but their chagrin was terrible when Lindbergh was sprung on them. They knew they were beaten so far as the crowd was concerned.

"I guess," said one Navy officer dryly, "there's nothing left for us but to send an emergency call to Dick Byrd to come out and lead the 'Sea Hawks' the next time they do their stuff."

And for the sake of the crowd's entertainment and their own morale they promptly went out with a formation of nine planes and executed what might be called an ensemble loop. They said nothing but it was an eloquent gesture.

"Tie that, Army, if you can," was what it said, "you and your big headliner that you never gave a tumble till he flew across the Navy's ocean."



Jack Harding, Eric Nelson. Fuller, Goebel. Theo. Wells, C. W. Sheppard. Col. Lindbergh, Gen. Fechet and aide.



Steele, Henderson. Greer, Amelia Earhart. Wetzel, Hull, Jeffries. Lt. Arnold, Casey Jones.



Tom Colby, Mrs. Pendleton. Tex Rankin. Al Wilson, Ruth Elder, Geo. Haldeman. Lt. Jeter. Earl Daugherty, Earle Ovington.

But not all the sights at the air races were in the air. Was not Capt. Roscoe Turner present in the flesh (lots of it), and in the famous Roscoe Turner uniform, than which there is none whicher, nay, not even on the garish lots and locations of Hollywood where Roscoe now holds forth as a cinema skyman And was not Bill Boeing on hand with his immaculate plus fours, cheering the weary (and thirsty) with draughts of his famed Air Mail Ambrosia? Yea, verily, Bill was there and so was Eric Nelson, recently recruited among the Boeing warriors and so fastidiously togged out in knickers as to be constantly mistaken for Mr. Boeing himself.

Perhaps the funniest scene of the entire air carnival was staged, not at Mines Field, but in a saloon at Juarez, Mexico, hundreds of miles away, just over the border from El Paso. Picture if you can (because our camera chose this, of all times, not to work) Bill Mara of the Stinson Company trying to refresh his mind regarding the taste of real beer, and Richard H. "Daredevil Dick" Depew standing with a foot on the rail and an elbow on the bar, earnestly striving to sell him a Fairchild folding wing all-purpose cabin monoplane. The only thing approaching it for real humor was a report circulated later in Los Angeles that Depew and Lindbergh had been out all night on a wild party and that both had been suspended by the Quiet Birdmen for drinking.

The trip to the air races itself was just one wild spree for Dick whose camera complex completely submerged the native caution that in years has earned him the sobriquet of "Mother Depew" among other airmen. As a result, the once cautious Depew was autographing peaks with his wing tips and "snapping at mountain tops" with his tiny kodak all the way from the Atlantic to the Pacific. At that, the *Spirit of Farmingdale,* or whatever Dick privately christened his machine had a tame voyage compared to that of the *Flying Suitcase* of Pioneer Instruments which was flown from New York to the Air Races by easy stages and great good luck with George A. Wies and "Back Seat Bessie" Davis at the dual controls. Miss Davis made front page in every town where the *Flying Suitcase* halted and George got a canteen and a rifle for emergency equipment, so both were happy. The *Suitcase* finally let George down in the middle of a first class desert but he got out the rifle and threatened to shoot all the glass out of it unless it would fly at least as far as the next airport.

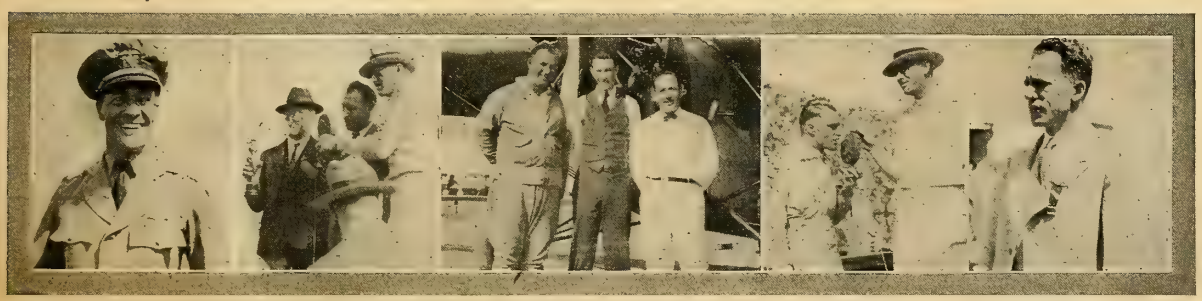
"You've got to be firm with these Stinsons," George declared in telling how he had met the emergency.

An aeronautical exposition scarcely would be worthy of the name unless Kenneth J. ("Spoons") Boedecker and T. Harold ("Doc") Kinkade were to be found somewhere among the exhibits. "Doc" quit the Wright Company some time ago to join the Lycoming Company and help develop a new air-cooled motor but he hung around the Whirlwind and Cyclone booth with "Spoons," Ken Lane and Joe Hartson as well as hobnobbing with his erstwhile boss,

(Continued on page 850)



Maj. Clagett. Com. Murray, Lts. Davis, Tomlinson and Storrs. Lundgren, Tomlinson, Thomas, Nelson, Morrison. W. Boeing.



Lt. Com. Davis. Art Goebel's father, Tucker, Clark. Hamilton, Frye, Vuelks. Richter, Clark. Harry Wetzel.

TECHNICAL



FOKKER SUPER-UNIVERSAL

THE Byrd Antarctic Fokker Super-Universal Monoplane, "The Virginia", is practically identical in design and construction to the Fokker commercial Super-Universal "Wasp" engined monoplane, which is one of the most successful transport planes in the United States and Canada. "The Virginia" was the first of a series of Super-Universals with a full cantilever wing of high lift type and powered with a Pratt & Whitney "Wasp" engine developing 410 horsepower at 1,900 r.p.m. The high speed of airplanes of this type, their quick take-off at high altitude, robust and sturdy construction, and well known stability and control under all conditions, have prompted their purchase by large air mail and commercial operators.

"The Virginia" was turned over to Commander Byrd after several additional features had been incorporated in it to meet expeditionary and Antarctic conditions. One of the most important structural changes was the installation of two additional gas tanks which will give it a cruising radius of nearly 2,500 miles.

The principal difference between the Byrd plane and the commercial Super-Universal is that it is short coupled, by which is meant that the distance between the engine and the wing is eight inches less than on the production plane. This has been accomplished by eliminating the fire wall located between the cockpit and rear end of the engine in order to provide more warmth for the pilot and mechanic and ease of access to the carburetor, mechanical pumps and magnetos. The cockpit heater, having its outlet between the legs of the pilot and directly in front of his seat, provides an additional supply of warm air, at the same time improving the ventilation of the pilots compartment.

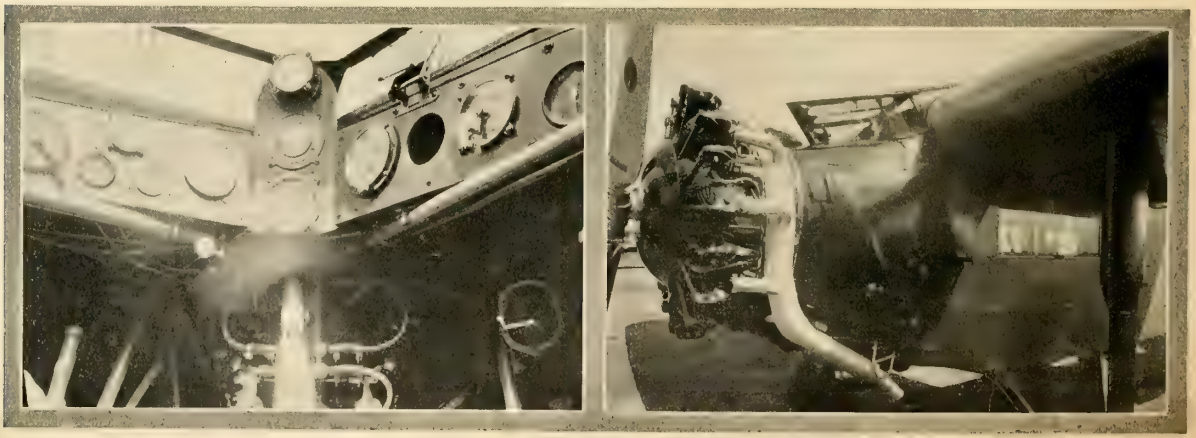
There are three devices for maintaining sufficient heat in the engine for proper carburetion and lubrication. The engine, which is a Pratt & Whitney "Wasp" of the latest series, is equipped with a new manifold heater. Hot air is trapped from the area surrounding the exhaust and taken to the air intake through a manually adjustable control. Thirdly, as on the stock model Super-Universal, an adjustable nose cowling, operated by the pilot, is mounted between the propeller and the engine to regulate the flow of cooling air over the engine crankcase as required by engine temperature.

Because of the absence of a fire wall, a high pressure type Pyrene fire extinguisher system is installed, easily and quickly operated by the pilot or his assistant. As an additional measure of safety, a conventional hand-operated one-quart size Pyrene extinguisher and an additional can of Pyrene liquid are carried within easy reach.

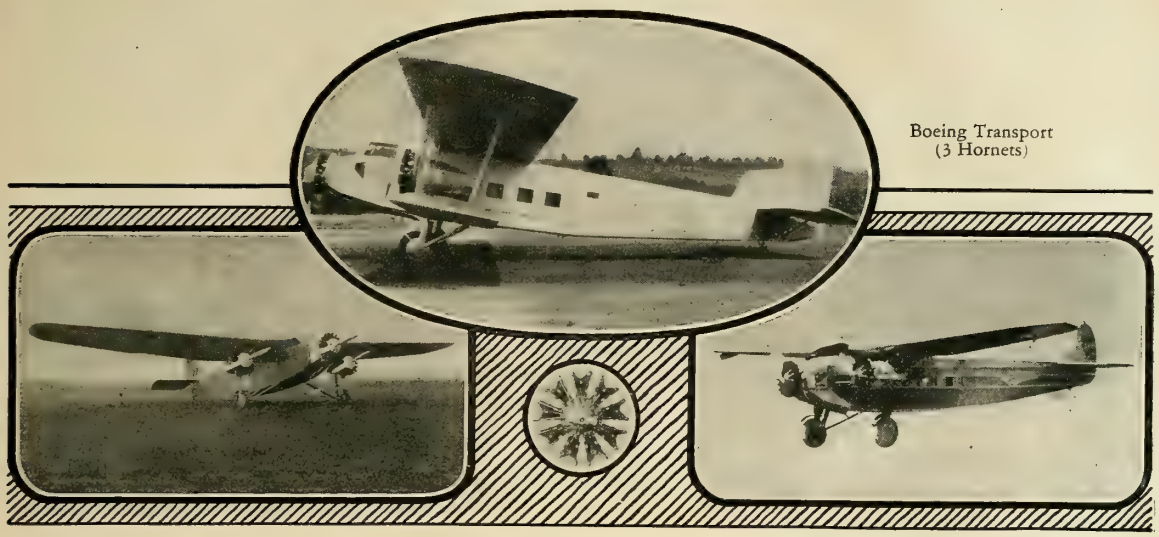
The flying instruments have been grouped together so as to be read easily, the same thing applying to the engine instruments. The principal instruments that are likely to be used when flying blind are located on a narrow center instrument panel. At the top of this panel is the Bank and Turn Indicator, with an additional level indicator below it. Directly underneath this instrument are the Earth Inductor Compass Indicator and the Altimeter. These have been so arranged that when flying the correct course the three needles are vertical, thus requiring the least amount of effort from the pilot for observation. The Earth Inductor Compass Generator is mounted approximately amidships between the wing and tail surfaces. It is a standard Pioneer instrument which has proved successful on many long distance flights. The controller or instrument used to set a given course is mounted on the right instrument board and next to it the Rate of Climb Indicator. The ignition switch is located on the left instrument board very close to the throttle and mixture control so as to be operated quickly in an emergency.

The fuel system consists of four tanks, three of which are located in the wing and the fourth on the floor of the cabin. The total capacity of these tanks is three hundred and eighty-five gallons, allowing twenty hours of flying at cruising speed, or a range of approximately 2,500 miles. The center wing tank, which has a capacity of one hundred and fifteen gallons, is mounted between the wing spars directly above the cabin and is connected in series with two ninety-five gallon wing tanks mounted on each side of it. These two latter tanks have glass gauges and are vented from the outside. The venting of the center tank is obtained by connecting it with the cabin tank, the latter having provisions for filling it while in flight. A hand pump is mounted on the front cabin wall, which is easily operated by the pilot and connects the cabin tank with the center wing tank so as to permit filling

(*Continued on next page*)



Instrument board and engine installation details of Commander Byrd's Antarctic Fokker Super-Universal



Boeing Transport
(3 Hornets)

Ford Tri-Motor (3 Wasps)

Fokker F-10 (3 Wasps)

Solving The Passenger Transportation Problem

The latest products of the foremost designers and manufacturers of tri-motor ships are "Wasp" or "Hornet" equipped. The fact that all of these ships are capable of sustaining flight and even taking off with any two of their three "Wasp" or "Hornet" engines carrying a full pay load, marks a new era in passenger transportation. In these passenger transports the utmost in speed, comfort and safety is attained.

The inherent characteristics of the light but powerful Pratt & Whitney engines have made possible flying characteristics in tri-motor ships never before available. Coupled with the extreme dependability as proved by the millions of miles flown in commercial service, the performance of these ships as well as the factors of safety in flying have been marvellously increased.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

DEPENDABLE ENGINES

(Continued from preceding page)

this tank while in flight, the return pipe having a small glass gauge as a telltale informing the pilot when this tank is full. The cabin tank is fastened to a demountable cradle, so as to permit easy removal from the cabin should the plane be required for the transport of its full capacity of freight or passengers. The three wing fuel tanks are connected in series with shut-off cocks within easy reach, and are so located as to enable the plane to run either on the center wing tank alone, the two ninety-five gallon wing tanks, or the three of them simultaneously. With the tank installed, there is ample room in the cabin for several passengers in addition to the seat next to the pilot. To the rear of the cabin on the right side is an opening in the floor 18" x 24", ordinarily closed by a trap door; to the front of this opening is mounted a bracket on which the Drift Indicator can be mounted. Directly above it in the ceiling of the cabin is another opening, through which the navigator can put his head and shoulders to obtain a view in all directions for sextant navigation. In addition to the above-mentioned fuel tanks ample space is provided for the carrying of loose five-gallon fuel cans. The oil tank located under the pilot's seat has a capacity of fifteen gallons, with an expansion space of 20 per cent of its volume. Provisions have also been made to permit refilling this tank while in flight. The tank is air-cooled having entrance and exit connections to the air stream, which are controlled by a butterfly valve from the pilot's seat. Anticipating taxiing on rough ground with the heavy loads that are to be carried in the Antarctic, a 5/8" diameter landing gear cord instead of the standard 1/2" has been used.

As a complete radio installation is installed in the ship, it was necessary to radio-shield the engine. A special radio generator of Hartz design, having dual armatures and single field, has been mounted in the customary place provided for lighting generator on the engine. Due to the size of this generator, it became necessary to divide the exhaust manifold in two parts thus providing two exhaust outlets, one on each side. The left hand exhaust pipe is connected to the cabin heating unit.

As on the production Super-Universals, the wing on the "Virginia" is of the standard Fokker, full cantilever construction covered with three-ply veneer. The top is painted a chrome yellow, while the under side of the wing is finished in a transparent lacquer revealing the natural wood construction. Fuselage is lacquered in Roma brown.

Specifications as supplied by the engineering department of the Fokker Aircraft Corporation are as follows:

Overall length	36 feet 7 inches
Height	8 feet 11 inches
Wing span	50 feet 7 inches
Wing area	370 square feet
Fuel capacity	385 gallons
High speed	140 miles per hour
Cruising speed	118 miles per hour
Landing speed	42 miles per hour
Rate of climb	1,000 feet per minute
Climb to 10,000 feet	15 minutes
Service ceiling	18,000 feet

ARROW SPORT PLANE

THE Arrow Sport is a new two-place biplane, manufactured by the Arrow Aircraft Corporation, Havelock, Nebr. Its special features are quickness of take-off, fast climb, ease of control in the air and slow landing speed. In the fuselage the steel tube Warren truss system is used. The cockpit has seats side by side and dual controls. Vision is unusually good.

High lift wings with an exceedingly high lift-to-drag ratio make possible a wide range of speed. The wings are so arranged that N struts may be put in if they are desired. The tail surface is of steel construction, flippers being controlled by a positive action push and pull rod. The stabilizer is adjustable and is operated from the left side of the cockpit on the pilot's side.

The landing gear is of the split axle type and has a wide tread. Either 26 by 3 or 26 by 4 wheels may be used. The Arrow Sport is powered by the new LeBlond 60 horsepower air-cooled engine or a 6-cylinder Anzani:

The LeBlond engine is installed in the model ilustrated in the view below.

An oval panel is set into the instrument board; it contains the tachometer, oil pressure and temperature indicators and a Navy type altimeter.

Specifications

Span, top wing	25 feet 6 inches
Span, bottom wing	25 feet
Wing area with ailerons	178 square feet
Aileron area, each	8.25 square feet
Length over all	19 feet 2 inches
Height over all	6 feet 11 inches
Span of tail plane	8 feet
Area of tail plane	21 square feet
Area of elevators	9 square feet
Weight, empty	524 pounds
Weight, full load	974 pounds
Useful load	450 pounds
Wing loading (full load),	5.5 pounds per square feet
Power loading (60 h.p.),	16.2 lbs. per h.p.

Performance—Full Load

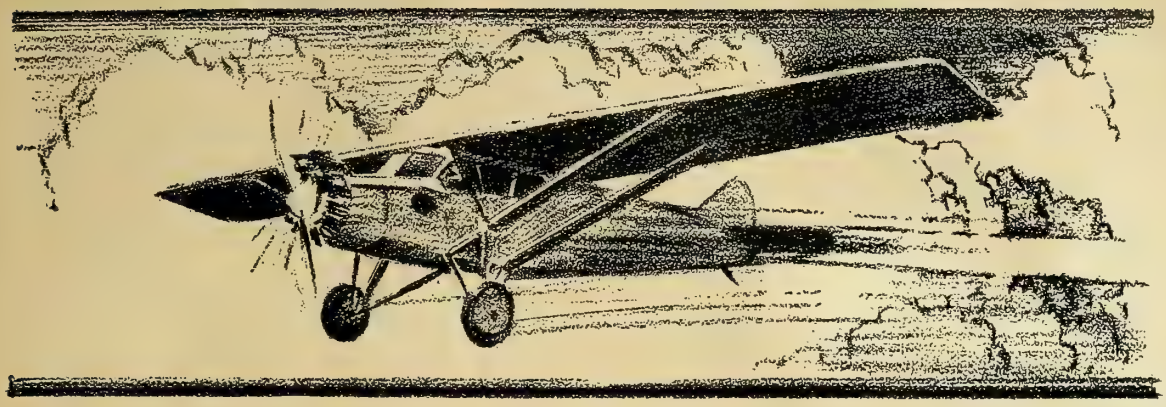
Maximum speed	105 m.p.h.
Minimum speed	36 m.p.h.
Rate of climb	680 feet per minute
Ceiling, absolute	17,000 feet
Ceiling, service	15,200 feet

Performance—Light

Maximum speed	115 m.p.h.
Minimum speed	32 m.p.h.
Ceiling, absolute	21,000 feet
Ceiling, service	18,000 feet
Rate of climb	1,050 feet per minute



The Arrow Sport plane and a view of the pilot's cockpit.



Stinson Superiority Proved by Official Records

To the prospective airplane owner, a close study of official results of the National Reliability Air Tour of 1928 reveals astounding facts.

They show, for instance, that Stinson Aircrafts finished *first* in their class —leading all other single Whirlwind cabin planes.

They show that Stinson planes carried greater loads per horsepower than any other cabin plane; that they took off more quickly and carried heavier loads more speedily than many planes flying with considerably lighter loads.

Official records prove conclusively that Stinson planes do give higher performance per horsepower than any other Whirlwind cabin plane.

Cold facts reveal Stinson Superiority. And Stinsons have demonstrated this Superiority repeatedly — in all parts of the world — under all conditions.

STINSON
AIRCRAFT CORPORATION

Address all inquiries to General Offices and Factory at
NORTHVILLE, MICHIGAN

STINSON AIRCRAFT
"The Aircraft Standard of the World"
MANUFACTURED BY THE STINSON AIRCRAFT CORP. DETROIT, MICH. U.S.A.

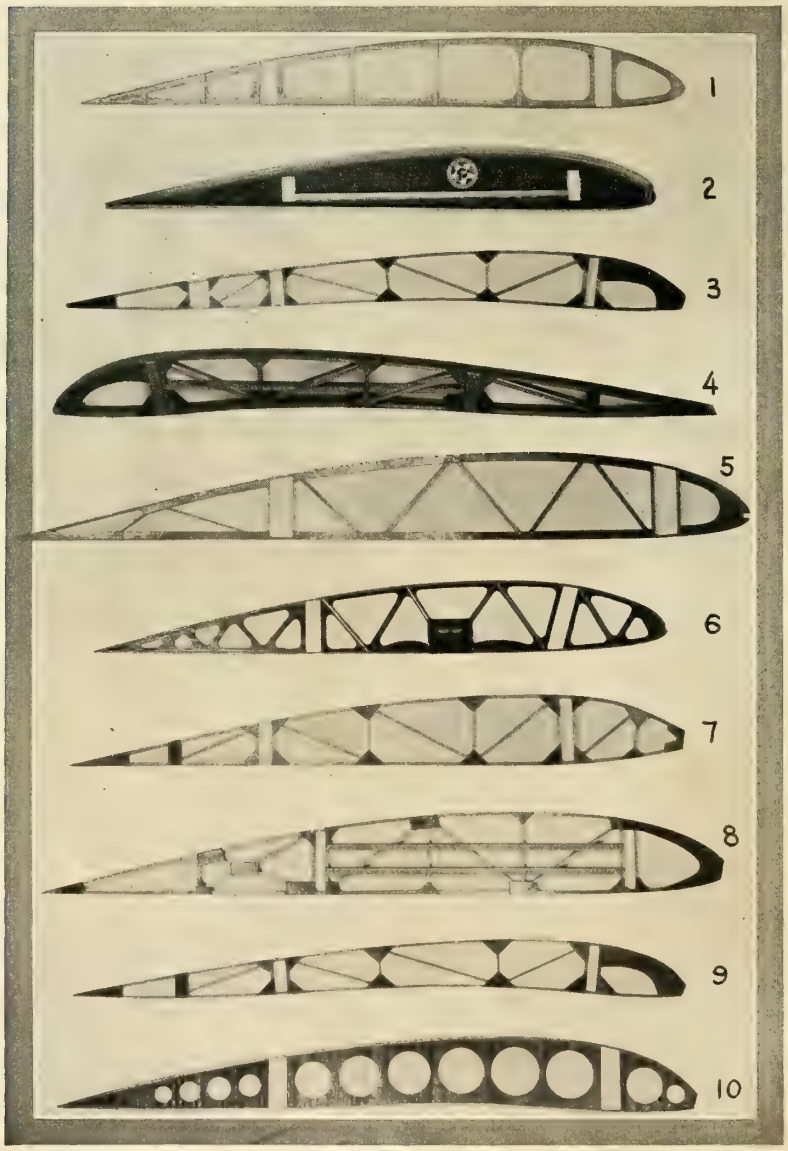
PLYWOOD AIRPLANE PARTS

THE part plywood plays in the construction of modern airplanes is revealed in recent photographs made public by the Haskelite Manufacturing Corporation of Grand Rapids, Michigan. Ever since 1917, when the government found the waterproof plywood used for making canoes the nearest ideal solution to their quest for a strong, light weight material which would stand up in all kinds of weather, laminated wood, or plywood, has played a tremendously important role. The essential work accomplished by plywood is not always realized by fliers and their passengers, but the accompanying photographs, provided through the coöperation of leading aircraft builders, show some of the ways Haskelite plywood is used in present-day planes.

A glance at the construction details shown by these photographs makes it clear why aircraft builders insist on the best materials possible. An outstanding example of the work plywoods are called upon to do is Colonel Lindbergh's "Spirit of St. Louis". Practically every service and every element possible was met successfully by this Haskelite-equipped plane.

Methods of airplane construction vary widely, so it is not surprising to note the wide difference in the way plywood is employed by the few builders whose construction is shown here. One striking difference noted is that some manufacturers cut holes in the Haskelite wood to reduce weight, while others use smaller pieces as struts and braces.

In the Eaglerock wing, Haskelite waterproof blood albumin plywood has been used for wing ribs, leading edges, and webs. This construction gives greater strength, weight for weight, than steel and is standard practice for the Eaglerock makers, the Alexander Manufacturing Company. Plane bodies built in this way possess comparatively little weight, yet they have proved capable of coping with the stresses and strains of commercial flying.



Typical wing ribs constructed with Haskelite plywood. 1—Waterhouse; 2—Consolidated; 3—American Eagle; 4—Kreider-Reisner; 5—Buhl; 6—Boeing; 7—Pheasant; 8—U. S. Airplane; 9—Advance; 10—International.

NEW RIVET-SQUEEZING MACHINE

MANUFACTURERS of airplanes and light sheet-metal products will be interested in a new portable pneumatic riveter that squeezes instead of hammers light rivets into place. This machine, known as the CP Squeeze Riveter, has been perfected by the Chicago Pneumatic Tool Company, New York, N. Y. This riveter is made in two sizes, the smaller one weighing but 8 pounds and capable of driving steel rivets up to ⅛ inch diameter, duralumin rivets up to $\frac{3}{32}$ inch diameter and aluminum rivets up to $\frac{1}{16}$ inch diameter. The larger size weighs 16½ pounds and drives steel rivets up to $\frac{3}{16}$ inch diameter, duralumin rivets up to $\frac{5}{16}$ inch diameter and aluminum rivets up to ⅜ inch diameter. The yoke can easily and quickly be removed and a wide range of interchangeable yokes can be furnished for almost any size of gap and reach. This interchangeable yoke feature permits the use of the same machine for a great variety of work. A number of these machines are now in use in airplane plants and anyone interested in driving light rivets rapidly and economically will be mailed S. P. 1674, illustrating and describing the CP Squeeze Riveters, upon application to the manufacturer.

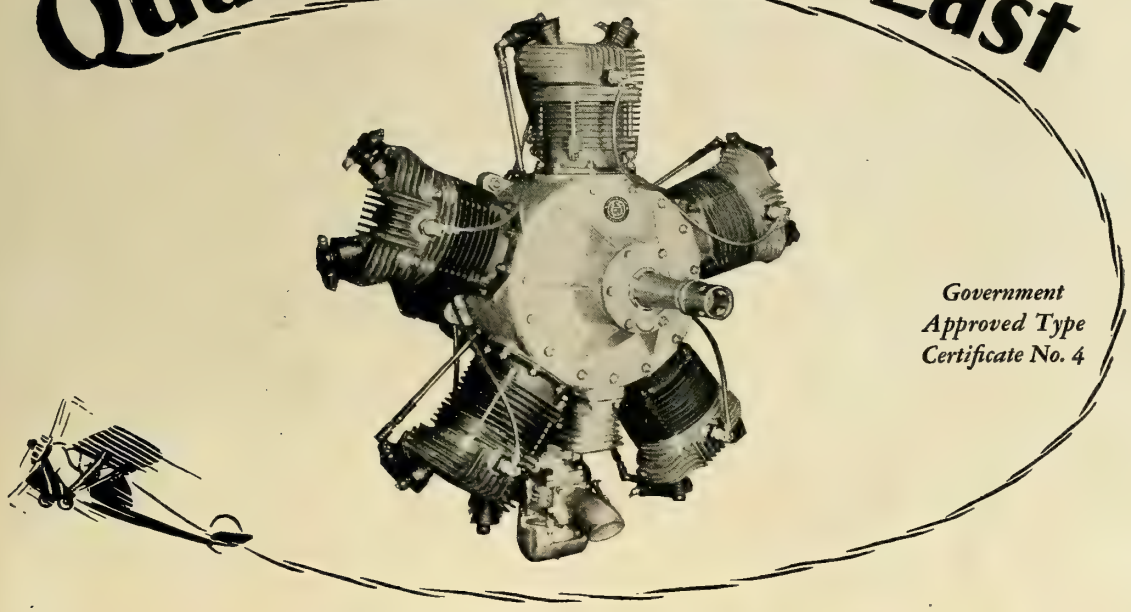
RUSCO AERO RINGS

F. ACKER THOMPSON, aeronautical sales manager of the Russell Mfg. Co., has announced that all Rusco Aero rings will bear thread markings identical to cord markings to indicate the date of manufacture of the rings.

This policy has been adopted for the protection of the customer in view of a greatly extended distributor system. In accordance with their service standards for shock cord, the rings now being fabricated are marked by double green threads indicating the latter six months of 1928. The registered Rusco trade mark, consisting of a red thread wrap at the end of the braided 2-ply outer cover, will be continued without change.

Mr. Thompson finds the aeronautical market rapidly expanding and is drawing on his wide experience in the automotive industry in coöperating with the manufacturers in working out materials and units in the textile and rubber field. Many materials which have been developed exclusively for the automotive market are finding their way into the aircraft industry. Among these are "wind lace", a beaded fabric binding for doors, "anti-squeak", a treated shim for hoods and cowlings, as well as heavy webbing and brake linings.

Quality First .. to Last



Government Approved Type Certificate No. 4

VELIE M5
AIRCRAFT ENGINE

There is no substitute for Quality . . . Velie M 5 Quality. ¶ There is no short cut to Dependability . . . Velie M 5 Dependability. ¶ The Velie 5 Cylinder Radial Aircraft Engine is manufactured to highest standard under closest supervision and inspection by our highly efficient and capable engineering staff. ¶ Now, as always, the name Velie is synonymous with quality, dependability and long life.

VELIE MOTORS CORPORATION, *Moline, Illinois*

"Ask the Pilot"

Long Life **VELIE**

OWNED AND OPERATED BY ITS FOUNDER ... 1908-1928 ...

DOUGLAS AMBASSADOR MONOPLANE

THE Douglas Ambassador monoplane is the first venture of the Douglas Company into the commercial field. The policy of this company in entering this new field is to make available for the private user an airplane of quality and dependability. In so doing, the idea of building for cheapness and competition has been abandoned, and the same care and skill that has characterized Douglas military airplanes has been and will be exercised in these commercial airplanes. This monoplane is arranged to accommodate two passengers in addition to the pilot.

These airplanes are backed by the experience of the "Round the World Flight" and the building of the standard observation airplanes for the Army and Marine Corps, huge torpedo planes for the Navy, mail planes for the Post Office Department, etc.

Materials: Fuselage, chrome molybdenum tubing. Wings, Russian birch, plywood covering. Landing gear, chrome molybdenum tubing. Tail surfaces, floors and furnishing, duralumin.

General specifications: Dual control (front controls may be instantly disconnected). Oleo landing gear—bendix brakes. Adjustable pilot's seat. Adjustable pedals and stabilizer adjustment in both cockpits.

The following specifications for the airplane are furnished by Mr. J. H. Kindelberger, Chief Engineer of Douglas Co.



The Ambassador, the Douglas Company's first commercial plane.

Wing span	35 feet
Chord	75 inches
Airfoil section	Gottingen 398
Wing area	212 square feet
Overall length	22 feet 6 inches
Engine	(Whirlwind) 220 horsepower
Fuel capacity (normal)	60 gallons
Oil capacity	6 gallons
Weight empty	1,750 pounds
Useful load (normal)	780 pounds
High speed	140 miles per hour
Landing speed	50 miles per hour
Service ceiling	14,500 feet
Rate of climb	900 feet per minute

COLORS VERSUS VISIBILITY

By Nan Hornbeck

THE question of colors for aircraft is giving manufacturers no little concern these days, and as it is one which should interest spectators as well as fliers, a right smart controversy on the subject would bring up some highly interesting points and help to solve this newest air problem. Here are some of the questions to be settled—Shall airships be decorated for show, for recognition, for visibility, or should all of these qualities receive equal consideration? At present visibility is the control word since we hear it mentioned most often. But before colors are selected or placed we shall have to determine which kind of visibility is required, for it seems there are many kinds, whether from the ground or aloft. Certainly visibility is most important, but can it be attained to the degree desired?

Let us go out on a flying field and consider what the pilot is up against. As he takes off a bit impatiently perhaps, his mind is pretty well occupied with that maneuver, and once having made sure of a clear field ahead, he is not looking for sudden encounters. Just the same, it does happen now and then that another plane swoops down out of a clear sky and negotiates a landing somewhere along his path. Right there is one instance where visibility rates high for both fliers. While there is plenty of room up above as yet, the flying fields will never seem large enough. Moreover, while the brightest colors lose their identity in a sun-flooded sky, chances for color visibility on the ground, barring earth and foliage colors, are excellent. We must admit that some colors are more valuable than others in landing or in taking off.

Now let us make a few more observations while still on the field. For short and long distance flights the pilot desires visibility principally in regard to other fliers. He wants to see and to be seen at least five hundred feet off. In the air it is the man higher up who holds the point of vantage, wherefor the greater responsibility is his, for though it is a difficult matter to distinguish colors against the sunlight, from aloft it is a simple matter. The main obstacles to visibility in the air are distance, smoke, fog (each of which dims or grays an object), strong sunlight (against which any color appears black), and sunset (which bathes all other colors in its own rosy glow). As you may have observed, in flight the wings become mere lines. The fuselage, regardless of its true color, is seen as a black speck against the sky, and only as it comes near enough do we see in clear weather if it is yellow, red or aluminum, et cetera. When the same craft passes into the bright, sunny sky, its coloring is lost beyond a thousand feet. It has suddenly become a mere black speck. This trick of Nature limits our range of colors for long distance visibility, and since we must reconcile ourselves to her competition, what are the chances for distance color visibility?

By common agreement the delicate sand or dust color combinations so popular for automobile use are taboo, and Nature's own greens and blues will certainly not do for wings. Rather will sport colors of flame hue be the standards for aircraft, but let them be no less attractive than striking. In this we cannot look to the birds for great color inspiration as the automotive industry has done, for Nature paints animal life for invisibility in protective colors. The gray gull over the wave, the brown thrush close to earth and the gay parrot in the tropics are truly camouflaged for the sake of invisibility; wherefor we must expect some difficulty in our attempts to outwit Nature.

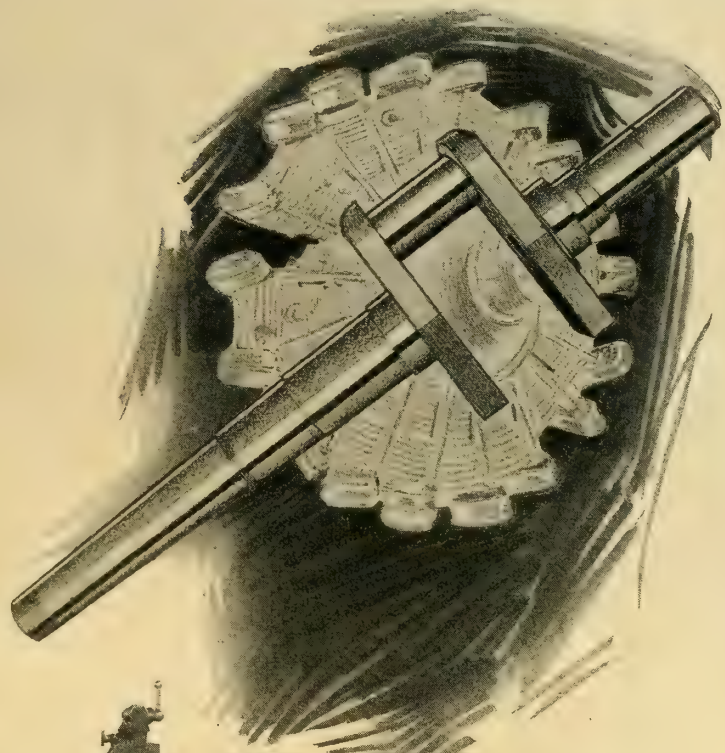
This government and the Canadian Air Force have replaced the old olive drab with the more noticeable yellow and in so doing have lessened the possibilities for collisions. As there are many other equally visible and far more attractive colors remaining for the private owner to select from, should we not eschew yellow and leave that color to distinguish government planes alone? Not only orange, tangerine and vermilion, but the more subtle intermixtures of these colors —burnt orange, flame, copper and henna— combine smartness with practicability, as

(Continued on next page)

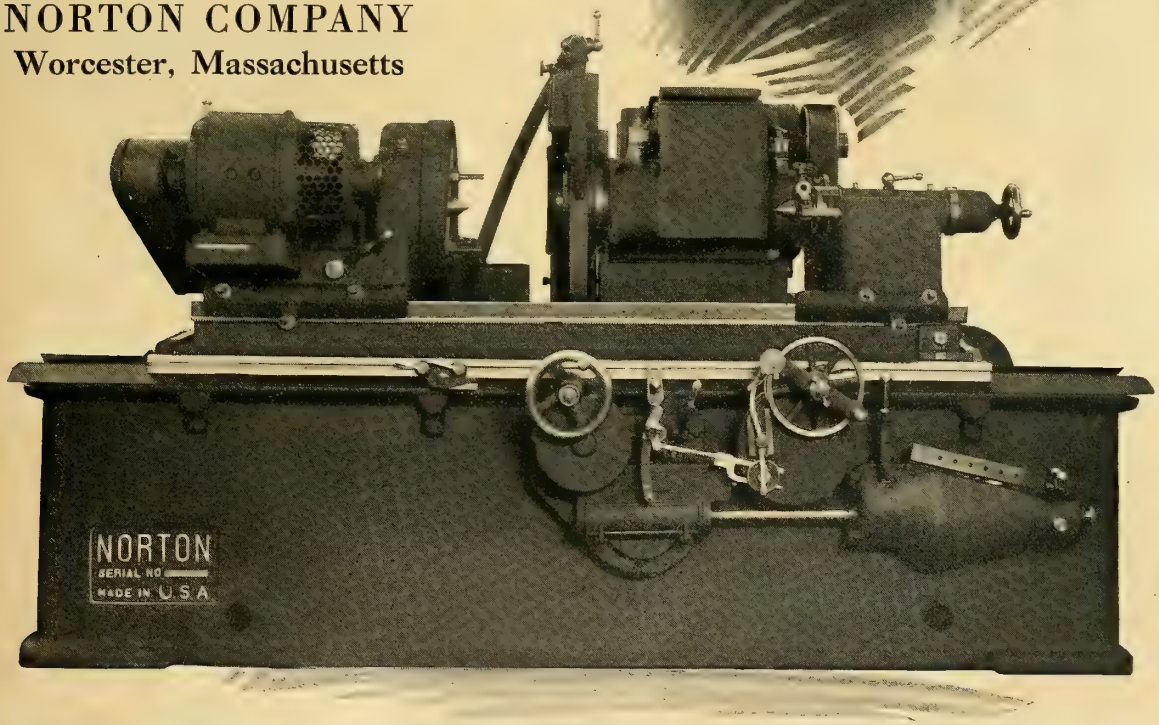
FOR GRINDING RADIAL TYPE CRANKSHAFTS

The Norton Hi-Swing Crankshaft Grinding Machine is built to grind with extreme accuracy crankshafts with larger swing than can be accommodated in the regular crankshaft grinding machine. It means fast precision production of crankshafts for the radial type of airplane motors.

This machine is also adapted for grinding crankshafts for small compressors, Diesel engines and other long stroke motors.



NORTON COMPANY
Worcester, Massachusetts



NORTON

Grinding Wheels
Grinding Machines

Refractories-Floor
and Stair Tiles

(*Continued from preceding page*)

they are visible against the blue, the green, and the white snow. It seems a pity to fill the heavens also with yellow taxis.

Individuality in the air is another valuable quality. If we know that Tom flies an "Ace-High" we shall look for his vermilion and black. Likewise, for Dick's tangerine and ivory "Streak" and Harry's bright green and orange "Meteor". Visibility is not sufficient unto itself. Appearance and recognition really must be considered also.

During the War, American and German planes were recognized by the distinguishing red circle and black cross respectively, which were placed on the rudder and on the upper and lower wings. The same areas marked with a solid patch of bright color, sufficiently large to be seen at five hundred feet, might suggest a solution for the problem although the Department of Commerce regulation allows only for license numbers in contrasting colors on the wings. All individual insignia goes on the sides of fuselage or rudder. Certainly it is important that a ship in distress, aground or afloat, will be sure to attract the attention of relief ships. As for field collisions it is not unlikely that some day fields will be so planned that landing takes place on one side and take-off on the other, to be indicated by colored beacons.

Then there is the exhibition plane. Ships used expressly for this purpose quite naturally should be painted in a different manner than those used in long distance flights. As they are so closely watched while in the air, the distinguishing color means much to the spectators and more yet to the fellow airmen circling above. Some fliers hold that the fuselage can better carry out the shadow color of our scheme, whereas the wings must stand out against the sky and clouds in vivid contrast. They will even sanction the use of light blue, gray or grass green for fuselage purposes. What do you think?

Perhaps this aircraft problem is more akin to that of the speed-boat skimming over the water. The sea and sky are analogous bodies of light unbroken by fixed shadows such as clutter up terra firma, prohibiting great speed in our transit. But when have we heard so much ado about visibility for speedboats? The noise of the motor, although it deafens the pilot, is about the only warning from this swerving, flying dart, and certainly the sun, playing over the sparkling mirror, renders bright coloring of little avail.

WARNER-ENGINED TRAVEL AIR

ALTHOUGH the Warner "Scarab" engine has been in production for only a short time, its performances in the Travel Air biplane have been unusually satisfactory. This model Travel Air is well suited to those desiring a plane with an engine of greater power than the 90 h.p. Curtiss OX-5 and yet not as powerful as the 200 h.p. Whirlwind. The Warner "Scarab" is a 7-cylinder radial which develops 110 horsepower. Illustrations and a brief description of it were published in the April, 1928, issue of AERO DIGEST.

New type wings as shown in the accompanying illustrations are optional; regular equipment is the conventional Travel Air wings with balanced ailerons.

Single controls are installed in the rear cockpit, but dual controls may easily be fitted when desired. Provision is made for two passengers in the front cockpit, the single pilot's seat being in the rear. A convenient door is provided for access to the front cockpit. Upholstering is with "Leatherwove".

The chassis employs rubber elastic shock cord in tension, which binds the members of the split axle to a cabane V mounting below the fuselage at the fire wall. The shock cord is covered with a streamlined cover. Landing wheels are 30 by 5 inches.

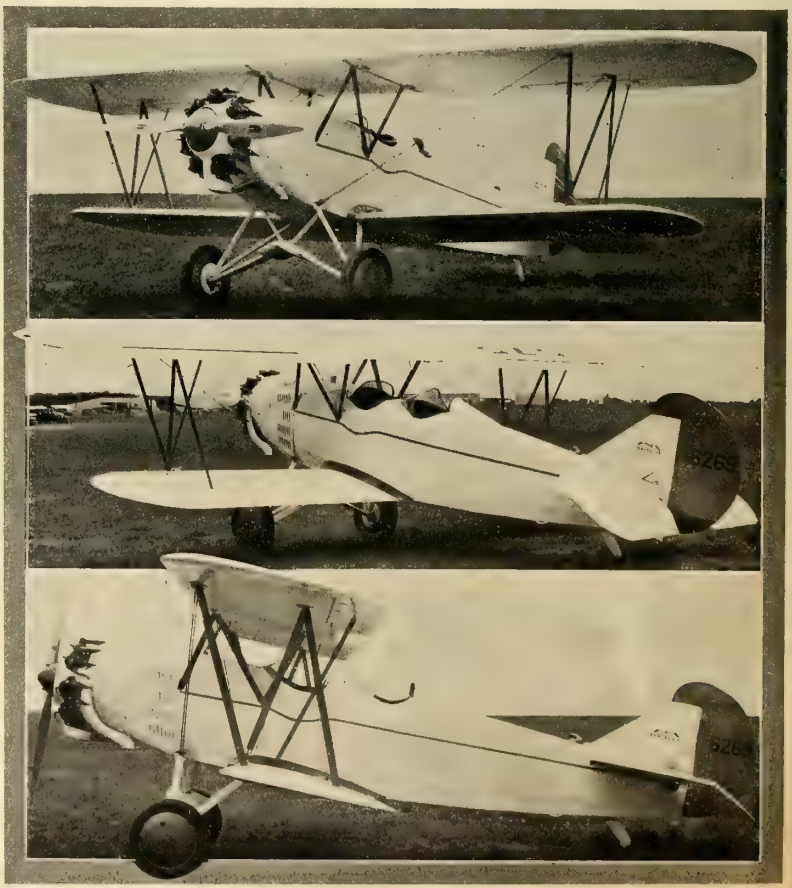
Navigation lights are not fitted, but all necessary electric wiring in the fuselage and wings is installed so that lights may be attached if desired.

Standard colors of this plane are silver wings and all other parts "Travel Air Blue". Other colors may be had by special arrangement.

The entire supply of fuel, 60 gallons, is fed by gravity to the engine. Cruising flight is maintained with a consumption of fuel at the rate of 8 gallons an hour. The performances of this model as given by the manufacturer are regarded as very conservative in view of its good showing in the air race from New York to California last month.

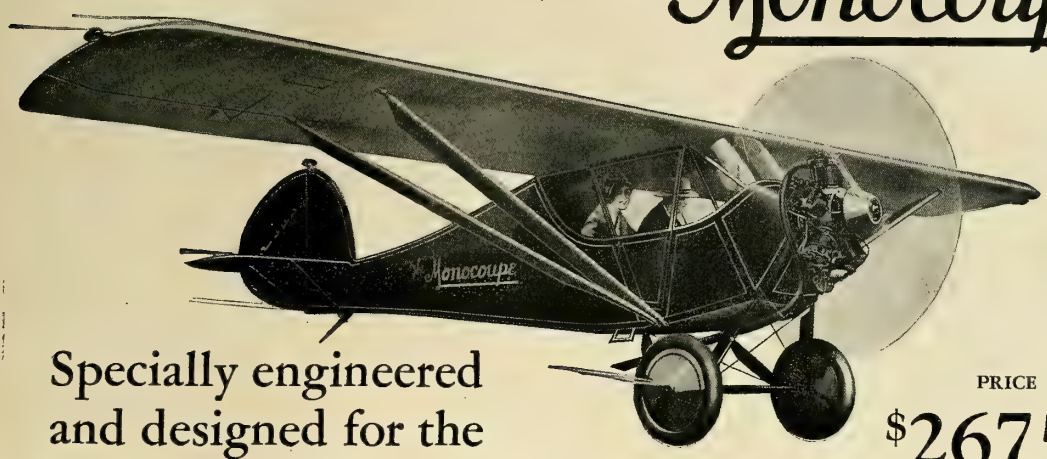
SPECIFICATIONS

High speed at sea level	105 miles per hour
Landing speed	43 miles per hour
Normal cruising range (with 42 gal. fuel)	400 to 420 miles
Overall span	34 feet 8 inches
Overall height	8 feet 9 inches
Overall length	24 feet 2 inches
Wing chord (upper)	66 inches
Wing chord (lower)	56 inches
Wing area	296 square feet
Engine (Warner Scarab)	110 horsepower at 1,800 r.p.m.
Fuel consumption at cruising speed	8 gallons per hour
Gross weight, fully loaded	2,300 pounds
Weight, empty	1,475 pounds
Pay load	360 pounds
Useful load (2 passengers, pilot, baggage, fuel, oil)	825 pounds



View of the new Travel Air powered with the 110 h.p. Warner "Scarab" engine.

The Monocoupe



Specially engineered and designed for the private owner

PRICE
$2675.00
FLYAWAY AT MOLINE, ILL.

MAN'S desire to fly throughout the ages is now realized, for here is an airplane so easily handled that anyone of normal faculties may operate it with the utmost confidence and safety.

Open the door and step into this luxurious coupe of the air, tailored in mohair with limousine appointments. Your companion is at your side—fly where you will—converse with ease. Fair weather, bad weather—this is Monocoupe flying, for you are protected from the wind, snow, rain, motor soot and gases.

The sturdy Monocoupe with the approved type certificate No. 70, issued by the U. S. Department of Commerce, is rapidly gaining public favor.

Its take-off in less than 100 feet climb, speed, ease of control, safety, economy and ability to get in and out of small fields make it the logical plane for personal use.

Determine now to enjoy the pride of ownership and the pleasure of this greatest of all modern sports in a Monocoupe.



POWERED by *Long Life* **VELIE**

Powered by the famous Velie 5 cylinder air-cooled radial M 5 engine, the Monocoupe turns out twenty miles for each gallon of gas, cruises at 85 and does 100 miles per hour wide out.

The Velie Aircraft Engine, approved by the U. S. Department of Commerce, (Official Certificate No. 4) has been selected due to its proven dependability—the same dependability ordinarily found only in radial engines of the $5,000 and $7,000 class.



Mono-Aircraft, Inc., are the first in the field to build national sales through an advertising campaign in national general magazines. Reprint of advertisement above which appeared in Liberty Magazine has brought in over 18,000 inquiries. The inquiries are turned over to Monocoupe distributors and dealers.

There is a great opportunity for dealers and distributors NOW. Valuable territory is still open. Wire, 'phone or write immediately for full facts regarding the Liberty Monocoupe franchise.

MONO-AIRCRAFT, INC.

Builders of the Monocoupe and the Monocoach

MOLINE, ILLINOIS, U. S. A.

RADIO CALL LETTERS FOR AIRPLANES

By James Montagnes

NOW that airplanes carry passengers as regularly as ships, and Europe is criss-crossed by airways, the airliner is as fully radio equipped as a trans-Atlantic liner. To the radio operator attached to the plane will come orders from his headquarters, addressed to his plane, or he can communicate with land. In either case, to identify himself with as little waste of time as possible, he uses call letters, in the same way that ships at sea use them, and broadcasting stations on land are identified.

The International Bureau at Berne, which looks after assigning all ships, coast stations, warships, etc., with call letters, has now devised a list for designating airplanes. The list calls for all airplanes to have five letter calls. The first letter will be the nationality designation, and the other four letters will be the registration mark of the airplane. Thus when an airplane bears on its wings FADAY, that also is its call letter for radiotelegraphy.

Since there are more nations than letters in the alphabet, the nationality letters in many cases are the same, but the next four letters will reveal the nationality. Where two or three countries have the same nationality letter, as is the case with Haiti, Hungary, Holland and Siam, whose letter is H, the first letter for the group of four letters is different. Thus Haiti can use all four letter combinations starting with H, Holland with N, Hungary with M, and Siam with S. Thus a Dutch airplane can be registered as H-NADU, and its call signal will be similar.

French airplanes plying the regular airlines such as Paris-London, Paris-Amsterdam, Paris-Berlin, are all using call letters which coincide with their registration mark on the wing. Thus FADCA, FADFQ and FAEAV are all planes on these routes, answering to these radio calls. French calls all start with the letter F followed by the four letter group which starts with a number of different letters. Where the airliner is of the dirigible balloon type and is attached to the French Navy, special calls are assigned, as is the case with the dirigibles having names. The French planes occupy the greatest amount of space in this new list, all machines on all air routes as well as army and navy ships which are radio-equipped being mentioned. The general call for French aircraft is FOZ.

British flying boats and land planes on the airlines and with the Royal Air Force are also mentioned, the letters all starting with G, such as GEBAJ. All Royal Air Force machines can be called by the Call of GEZAA, used as a general signal.

Since most of the Dutch planes listed are equipped for radiotelephony, it is best to explain how such ships can be called. When using voice the procedure is to make a call using the whole or part of the name of the owner of the aircraft (Air Navigation Company or private owner) followed by the last two letters of the registration mark. The airplane H-HACR, its registration mark, uses telephony. Its radio call is therefore KLMCR, the KLM being the first three letters of the air company name.

Italian ships are again otherwise designated on the air. For registration they use the five letter system starting with I and follow this with a numeral. For this reason the radio calls are all specially assigned, and the Italian plane I-AYZZ 70 has as its radio call IXAAG.

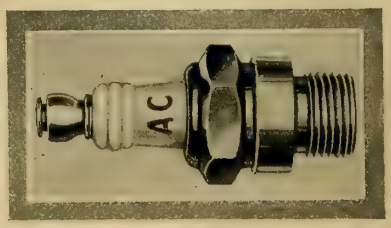
The United States is only credited with two call letters in this list, which is the latest, issued in February. The two calls are those of the *Los Angeles*, NERM, a special navy call, and the ill-fated *Dawn* call, WMU, again a special call.

The Berne List, which is to be found on every steamer and at every coast station throughout the world, is already a thick book. It lists all steamers, warships and coast station calls. When the aircraft calls are added it will be a much bigger list. France so far heads the nations with its aircraft radio calls, there being over 90 calls.

Most of the planes use the long wavelength, varying from 600 to 1,550 meters, with 900 meters as the stand-by for watches. With the exception of a half dozen French Navy balloons, all the planes use continuous wave transmission or telephony. These few dirigibles use spark.

NEW AC SPARK PLUG

THIS new type metric aircraft spark plug has just been introduced by the AC Spark Plug Company, Flint, Michigan. Known as type NN-1, it is recommended

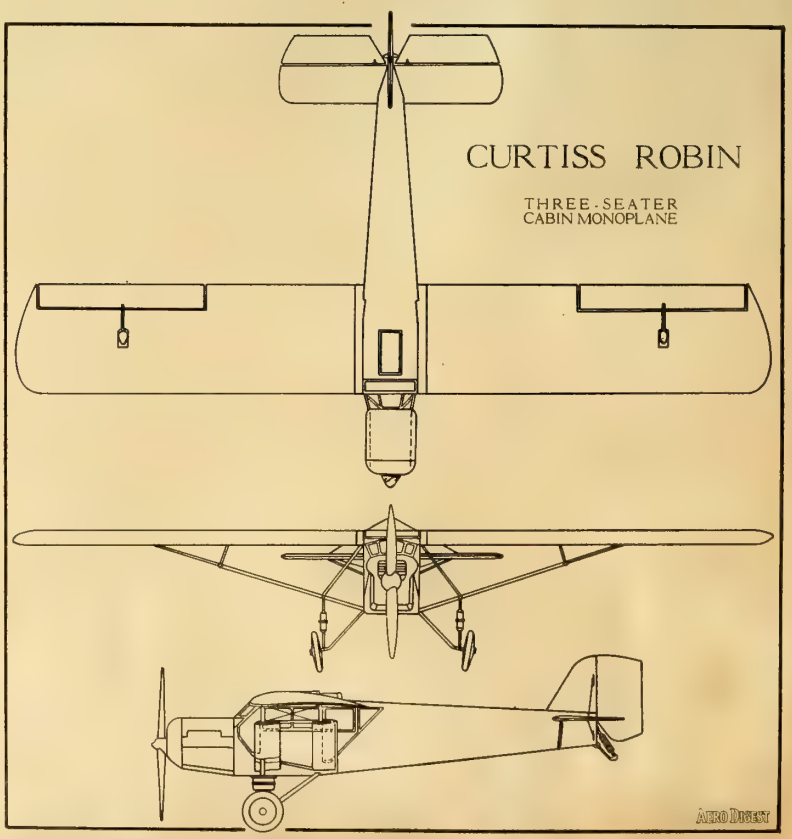


for high speed, high compression, aircraft engines. It is also adapted for regular aircraft engines operating at sustained wide open throttle and higher speed than cruising.

CURTISS ROBIN

DETAILED specifications and illustrations of the Curtiss Robin appeared in the June, 1928, issue of Aero Digest. The three-view drawing reproduced below shows the outlines of the production model equipped with the Curtiss 90 h.p. OX-5 water-cooled engine.

At sea level the Robin has a high speed of 100.5 miles an hour and its landing speed is 45 miles an hour. Its normal cruising speed is 83 miles an hour. The rate of climb from the ground is 450 feet a minute and at 10,000 feet its rate of climb is 180 feet a minute.



Outline drawings of the production type OX5 engined Curtiss Robin monoplane.

Every Two Hours

...an Eaglerock leaves Colorado



At the Gateway to the Garden of the Gods, Colorado

IT IS DELIVERED to a new customer usually — but more and more often to an old customer — his second or third Eaglerock. Soon, one will leave each hour — after that, what?

The reason? — VALUE. The new center section Eaglerock is undoubtedly the best ship in its class in material — workmanship — appearance — performance and complete standard equipment.

It is by study of the customer's needs — building satisfaction into each ship — passing on savings to customers by constant improvements that Eaglerock's present success has been won.

When you buy an Eaglerock equipped with a Whirlwind J4 or J5, Hisso "A" or "E," or Curtiss OX5 or OXX6 you buy a ship built under U. S. Department of Commerce inspection and CERTIFIED. It is priced at $2250 on factory field less power plant and propeller.

ALEXANDER AIRCRAFT CO.

Dept. 403, Alexander Industries Bldg., Colorado Springs, Colo.

The New EAGLEROCK

AIRMASTER MONOPLANE

THE first Airmaster monoplane built by the Ohio Aero Manufacturing Corporation at Youngstown, Ohio, passed preliminary flight tests to the satisfaction of its designers and builders, who expect to be in moderate production of these ships soon.

Considerable interest has attached to the Airmaster cabin monoplanes during their construction since the first announcement of the formation of the company a few months ago. During this time, experimental work has been carried on at the factory in Youngstown, and the present ship, known as a Youngster model and powered with an Anzani 80 h.p. engine, is the outcome of such experimentation.

The ship is built with many of the refinements which characterize the better grade of automobile bodies. It is designed to meet the requirements of the individual airplane owner, the business executive who uses air travel extensively, and the private flying club. While the first ship is equipped with an Anzani engine, the LeBlond Sixty will be the regular equipment of the Youngster model. The three-place Airmaster will be equipped with the LeBlond Ninety engine as standard equipment. Two more Youngsters and one three-place Airmaster are now under construction in the factory.

The Airmasters are externally braced high wing monoplanes of conventional new production type.

Tests of the ship now out have shown a top speed of 142 miles per hour. The landing speed is 42 miles per hour. No data are available as to absolute ceiling.

The fuselage construction is of steel tubing welded in a Warren truss, with conventional type of engine mount at the front. They can be equipped with any new radial air-cooled engine. The wing is of Sitka spruce construction, with compression ribs of steel tubing and double wire bracing. Gasoline tanks carrying twenty-five gallons are placed in the wing bays next to the fuselage. The wing is domed over the cabin to enhance the interior appearance. Ribs are of truss construction and are nailed and glued to the spars. The leading edge of the wing is reinforced with sheet duralumin and is light and rigid. The trailing edge is formed by a duralumin channel. The entire ship is treated with Lionoil for protection against moisture and is covered with grade A fabric.

Control surfaces are not balanced. Ailerons are of steel tubing construction, hinged to triple braced sub-spars, and extend approximately one-half the length of the wing. All control surfaces are actuated by extra flexible cable, the control system being so designed as to give special ease of manipulation. The wing is wired for navigation lights.

The airfoil system used on the Airmasters is the Clark Y, and the same airfoil is extended to the streamlining of the external wing struts, the treatment being with balsa wood covered with fabric. This streamlining is said to increase the lifting capacity rather than to add to the flying weight of the ship. The rear strut on each side is adjustable.

The fuselage is streamlined just enough to give a pleasing contour; balsa wood is also used for this purpose. No wire bracing is used in the fuselage construction.

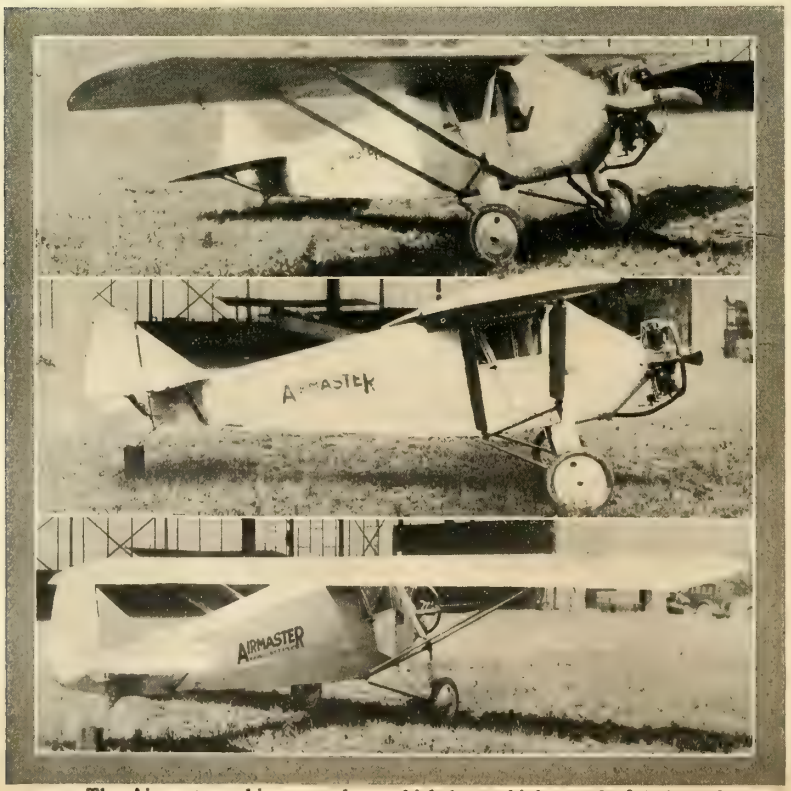
One door on each side gives access to the cabin which is furnished with comfortable wicker seats. In the Youngster, passengers and pilot sit side by side. In the three-place Airmaster, the pilot sits in front in the center of the fuselage and the passengers at the rear of the cabin. Ample space for baggage is provided, and side windows of shatter-proof glass may be opened at the will of the passengers.

The cabin is upholstered in a harmonizing shade and impresses one with its spaciousness and luxury. All instruments are mounted on an instrument panel equipped with indirect lighting system. Dual control, while not standard, can be installed in either size ship. The rudder is controlled by foot pedals, and all vital points in the entire control system may be reached by zippers in the fabric cover.

The landing gear is of the divided axle type, with 7-foot 3-inch tread. Vertical struts tie the axle to the top of the fuselage through the wing struts, an ingenious fitting, with universal joint as the means of connection at this point. The lower portion of these vertical struts contains the wrapped cord shock absorber. The tail skid is a spring lever braced against the tail post.

The power plant is accessible by means of removable cowling. The gasoline lines contain pet cocks which can be reached by the pilot. The Youngster model, now being flown at Youngstown, is equipped with a Paragon Monoid propeller.

The LeBlond engines with which the production type Airmasters will be equipped were described in detail in the June, 1928, issue of AERO DIGEST. The LeBlond 60 is a 5-cylinder radial type developing 60 h.p. at 1,800 r.p.m.; the LeBlond 90 has 7 cylinders and is rated at 90 h.p.



The Airmaster cabin monoplane which has a high speed of 135 m.p.h.

Specifications

Length overall	21 feet
Height overall	7 feet 1 inch
Airfoil section	Clark Y
Wing span	32 feet 9 inches
Wing chord	5 feet
Wing area	160 square feet
Area of ailerons	16 square feet
Area of stabilizer	20 square feet
Area of elevators	12 square feet
Area of fin	2.3 square feet
Area of rudder	5.9 square feet
Weight empty	850 pounds
Pay load	500 pounds
Gross weight loaded	1,500 pounds
Power plant	LeBlond 90
High speed (full load—sea level)	135 miles per hour
Cruising speed	94 miles per hour
Landing speed	42 miles per hour
Climb at sea level	500 feet per minute
Service ceiling	8,000 feet
Range at cruising speed	350 miles



CARGO-SPACE and SPEED—The Pitcairn Super-Mailwing!

The combination of adequate cargo space and high cruising speed found in the new Pitcairn Super-Mailwing makes the ship the logical choice of air mail operators.

The mail compartment is 40 cu. ft. in size and can accommodate 500 lbs. of mail and express. It is entirely free from cross-members and wires, and its cover opens from either side of the fuselage.

The pilot's cockpit is provided with an adjustable seat, which can be raised to increase visibility for landing or taking off.

The Pitcairn Super-Mailwing, completely equipped for night flying, and powered with Wright Whirlwind Engine, is priced at $11,500. We shall be pleased to submit complete specifications and performance data at your request.

PITCAIRN AIRCRAFT, INC.

LAND TITLE BUILDING - - PHILADELPHIA

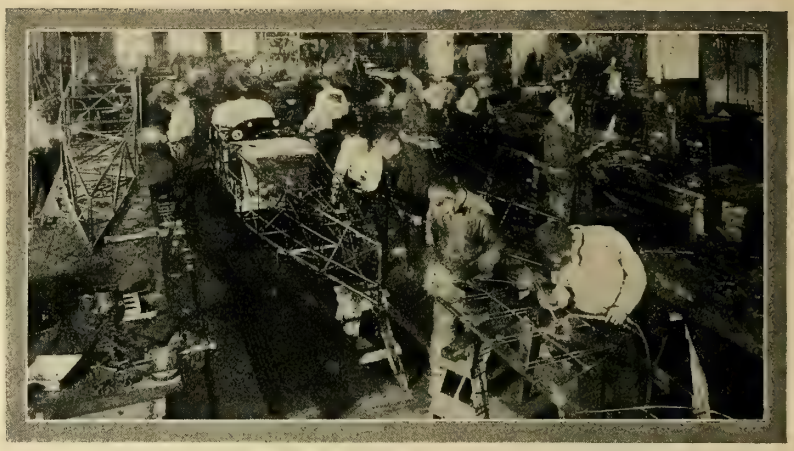
HISPANO-ENGINED LINCOLN-PAGE

THE new production job by the Lincoln Aircraft Corp. was designed so that either OX-5 or Hispano-Suiza motors may be installed by merely changing the motor mount and the motor cowling. This tends towards simplicity, for ease of production and interchangeability.

The fuselage is of conventional design, construction being of aircraft seamless steel tubing with all joints acetylene welded. The seats are made entirely of aluminum. A large baggage compartment to the rear of the pilot's cockpit, having a capacity of 8 cubic feet, affords ample space for carrying luggage. The door to this compartment is built into the rear of the pilot's seat affording convenient access without adding ungainly doors in the side of the fuselage. All the metal is given a coat of Lionoil, before covering, to prevent corrosion. A deep turtle deck on the upper side aids to make a good streamline fuselage. Cockpits are upholstered in leather and afford ample room for pilot and passengers. Extra large windshields are provided. The fuselage is fabric covered.

The airplane is powered with the Hispano-Suiza 150-180 h.p. engine mounted on ash bearers, supported by steel tubing. The engine may be readily detached from the fuselage by removing the four mounting bolts. All the mounting tubes are reenforced by telescoping a heavy gauge tube inside the main members. A water expansion tank is placed above the motor and bolted directly to the fire wall. The radiator, mounted below the fuselage in the slipstream, affords ample cooling in hot weather while shutters aid in warming the motor up at low temperatures. A terne plate fire wall insulates the engine compartment from the rest of the fuselage. An oil cooling tank is placed directly below the motor, inside the cowling. Cooling is effected by having louvers in both the front and rear of the cowling, the forward louvers being reversed.

The ship is equipped with dual control for instruction purposes while the front controls may easily be removed for passenger work. The rudder, elevators and ailerons are actuated by stranded flexible cables connected directly with the control stick. The stabilizer is easily adjustable from the rear cockpit by a simple lever and ratchet arrangement. Radiator shutters are operated in a similar manner with another lever. A double throttle is installed as standard equipment so that the ship may be flown either right or left handed.



Welding department of the Lincoln Aircraft Corporation.

The tail group is built up entirely of steel tubing with joints acetylene welded. Elevators are built in a unit requiring only one horn which is placed inside the fuselage. The entire group is fabric-covered.

The landing gear is constructed of chrome-molybdenum streamline steel tubing supporting a nickle steel axle. A split type axle is used with rubber cord absorbing the shock. The axle is streamlined with balsa wood. 30 by 5 inch straight side tires are standard equipment.

Wings are of conventional construction throughout. The Gottingen 436 wing curve is used. Spars are of spruce, being solid throughout their length affording ample excess in strength requirement. Ribs are built up of basswood with lightning holes, and caps strips top and bottom. Compression ribs are solid spruce. Drag wires are of solid hard aircraft wire. The leading edge has extra nose pieces to prevent the cloth from drawing excessively in between nose ribs. A gasoline tank is installed in the inner bay of each upper panel, plywood being screwed and glued above and below the tank to take the drag load. A completely enclosed wind-driven fuel pump is installed in the upper wing with its wind-mill shaft extending through the leading edge.

Construction of the ailerons is similar to that of the wing, having spruce spars and basswood ribs. The entire wing panel is fabric-covered and doped. External bracing consists of streamline steel tube struts, and streamline steel tie rods.

Gasoline is carried in the fuselage in a forty-two gallon tank and in the upper wing where two tanks having a total capacity of twenty-five gallons are located. The fuel pump in the upper wing pumps gasoline from the fuselage tank to the wing tanks. Full gravity feed is maintained between the carburetor and wing tanks which are high enough to maintain ample head. An overflow line carries any excess gasoline that may be pumped into the upper tanks back down into the fuselage tank. A sight gauge readily seen by the pilot (mounted on a center section strut) is placed in the overflow line. The fuel pump may be inspected through a pyralin window.

Standard instrument equipment consists of altimeter, tachometer, oil pressure gauge, thermometer, and ignition switch. A Hamilton spinner type propeller is standard equipment but a Hamilton metal propeller with metal spinner can be supplied at additional cost.



The Lincoln-Page biplane powered with the 180 h.p. Hispano-Suiza engine.

Specifications

Length overall	23 feet 2 inches
Span	32 feet 8 inches
Height overall	9 feet 3 inches
Gap	60 inches
Wing cord	58 inches
Wing area	300 square feet
Wing loading	8.3 pounds per square foot
Power loading	13.9 pounds per horsepower
Weight empty	1,440 pounds
Useful load	1,060 pounds
Pay load	538 pounds
Gross load	2,500 pounds

Performances

(With normal full load)

High speed at sea level	130 miles per hour
Cruising speed at sea level	110 miles per hour
Rate of climb at sea level	1,000 feet per minute
Service ceiling	16,000 feet
Landing speed	48 miles per hour
Range at maximum speed	600 miles
Range at cruising speed	715 miles

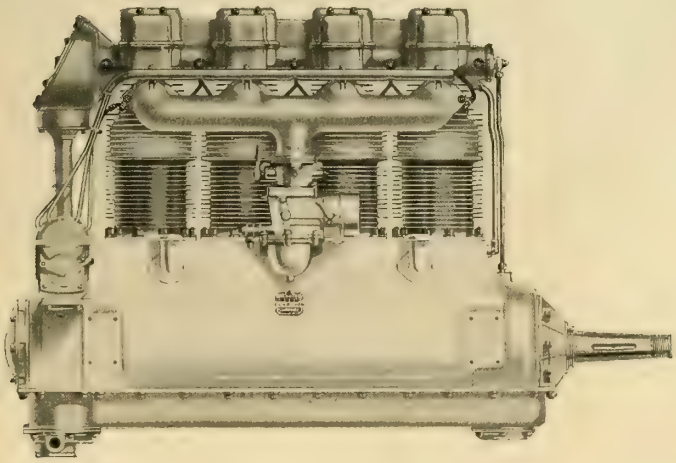
4 -IN LINE- SCORPION AIR COOLED
REGISTERED TRADEMARK

AERONAUTICAL PRODUCTS
CORPORATION
MANUFACTURERS
NAUGATUCK, CONN., U.S.A.

The Aeronautical Public—

Gentlemen:

Here it is---our new 4 cylinder-in-line, air-cooled, "Scorpion". 100 H.P. plus, at 1800 R.P.M.--and it weighs only 290 pounds. The "Scorpion" may be installed in any type of plane now being used.



Bore $4\frac{5}{8}$", stroke, 5". Two Bosch Magnetos. Zenith Carburetor. Inertia Starter. Overhead Valve, camshaft rockers and our patented cantilever springs completely enclosed. Salt filled exhaust valves. Force feed oiling system with dry sump. Steel forged cylinders with fins milled out of the solid. Cylinder barrel screwed into aluminum alloy head with aluminum bronze valve seats. Power and Assurance.

Yours very truly,

AERONAUTICAL PRODUCTS CORPORATION

Harry J. Thomson

President

ALL MATERIALS U. S. AIR SERVICE REGULATIONS

QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE. ALL AGREEMENTS CONTINGENT UPON STRIKES, ACCIDENTS AND OTHER CONDITIONS BEYOND OUR CONTROL

CAVALIER MONOPLANE

THE Cavalier, a product of the Star Aircraft Company, Bartlesville, Oklahoma, is a light two-place high wing cabin monoplane. Some novel features are embodied in its design, but on the whole no radical departures are noticeable; perhaps the most striking things about it at first sight are its sensible adherence to accepted practice and its obvious sturdiness and neat symmetry.

The fuselage is of steel tube, and the entire tail units are also of tubing. Wood is used only in the wings and cabin finishing. The wings themselves have solid one-piece routed spruce spars with ample fillets at all fitting stations, and the ribs have spruce *cap strips* trussed with spruce struts secured by plywood gussets. Round Macwhyte tie-rods are used in the interior truss. Two thirteen-gallon gas tanks are provided—one in each wing root—and the drift stresses in this bay are carried on into the fuselage by the employment of diagonal grain plywood panels secured to the front and rear spars and to two box ribs at the bay ends.

The wings are in two pieces, thus permitting the employment of dihedral as well as enabling the owner to make more economical replacements in case of breakage. The spar continuity across the top of the fuselage is completed by the use of heavy gauge tubes, provided at their ends with lip fittings to receive the spar ends. These tubes lie completely above the longerons and are attached by welding. A strong tubular diagonal cross truss in this upper fuselage bay takes the drift stresses and serves as one of the units of a cantilever scheme from the motor mount to the bay in the rear of the pilot's seat, thereby eliminating the necessity of any cross bracing in the entire cabin. This scheme is also carried out in the bottom fuselage truss.

The wing struts are of chrome-molybdenum tubes, faired off with small tubing without welding, except at extreme ends. The screw adjustment fittings at the lower ends are of nickel steel, and the fittings on the bottom of the fuselage to receive them are of chrome-molybdenum. This specification also applies to the strut fittings on the spars, which, incidentally, are so designed that one bolt through the neutral axis of the spar takes all the load. There is no eccentric loading at these points, and this is further vouchsafed by carrying the struts straight down to their fuselage sockets, staying within the same plane as the vertical axis of the spars. The shear bolts at both strut ends are interchangeable. They are of Government specification nickel steel.

Particular attention has been given the design and arrangement of the cross tubes in the bottom of the fuselage truss which receive the flying loads. They are both of more than ample diameter and gauge.

In the aileron control system, the aileron spar has been made to act as a crank itself by hinging it at its very top and actuating it by an attachment at the very bottom. A light and strong bell crank, just back of the rear spar, provides the movement through the medium of a short push and pull rod. The elevators are also operated by the pushing and pulling of a single crank neatly concealed within the vertical fin.

The landing gear is an application of the split axle type. The tail skid is of leaf spring steel and is secured just below the tail post.

Standard equipment includes a Hartzell or a Hamilton wood propeller.

The Velie M-5 air-cooled engine was described in the May, 1928, issue of AERO DIGEST. This 5-cylinder engine delivers 70 h.p. at 1,800 r.p.m.; its maximum power output is 80 h.p. at 2,000 r.p.m. Fuel and oil consumption per h.p. per hour are exceptionally low; fuel, .55 pounds—oil, .025 pounds.

Specifications

Wing span	31 feet 6 inches
Overall height	6 feet 3 inches
Overall length	19 feet 8 inches
Chord	5 feet 1 inch
Wing area, including ailerons	157 square feet
Aileron area	17.85 square feet
Rubber area	6.5 square feet
Fin area	3.7 square feet
Stabilizer area	12.8 square feet
Elevator area	8.8 square feet
Landing gear tread	66 inches
Weight without motor	476 pounds
Weight with motor fully equipped	740 pounds
Useful load	575 pounds
Wing loading	8.31 pounds
Power plant, Velie M-5	70 horsepower
Fuel capacity, (2 wing tanks)	26 gallons
Oil capacity	3 gallons

Performance Data

Maximum speed	105 miles per hour
Cruising speed	87 miles per hour
Landing speed	38 miles per hour
Climb fully loaded	800 feet per minute
Climb in 10 minutes	6500 feet
Service ceiling	12,000 feet
Fuel consumption	6 gallons per hour
Oil consumption	1.25 pints per hour
Take-off in dead calm	within 200 feet
Land in dead calm	within 150 feet

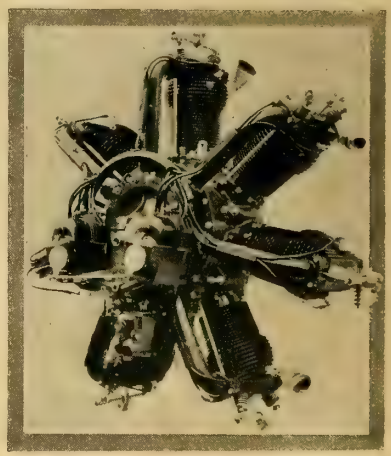


The Cavalier monoplane produced by the Star Aircraft Co. of Bartlesville, Okla.

COMET ENGINE

THE brisk sale of Comet aviation engines reported since the official fifty-hour Department of Commerce test was passed by that engine, indicates that the Aircraft Engine Company has produced a power plant that will do much toward bringing the light plane industry out of the difficulties it has faced since the exhaustion of the war-time supply of OX-5 engines.

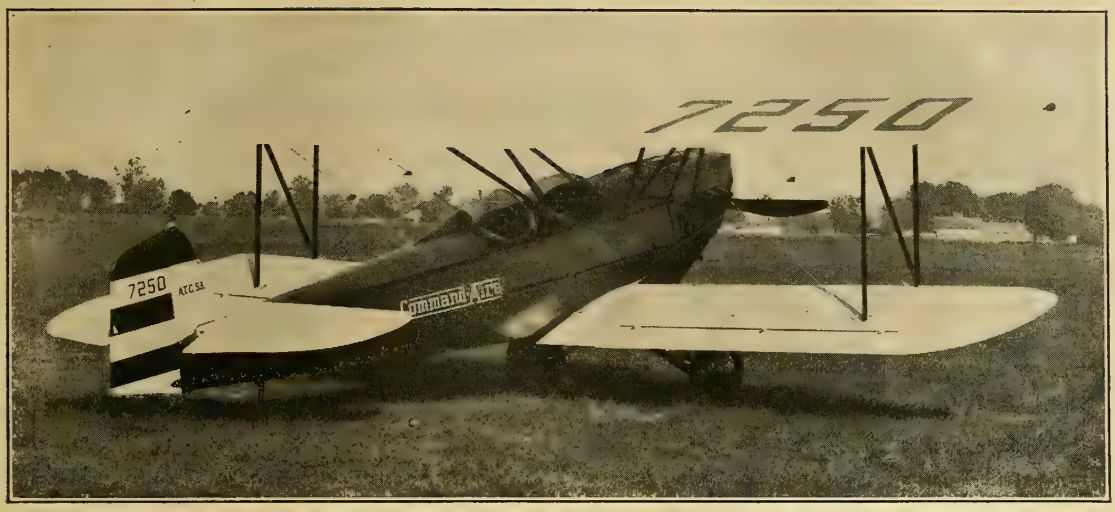
The Comet is an air-cooled, radial engine of 150 h.p. It was described in detail in the April issue of AERO DIGEST. It has passed the Government test in five consecutive days of ten hours' running per day (instead of the usual five hours per day for ten days), with a particularly fine record according to the reports, not having a single forced stop or not requiring even a minor adjustment.



The 150 h.p. Comet aviation engine.

Extensive block and flying tests which were conducted demonstrated its power and dependability so thoroughly that the first unit of twenty-five was put in production before the Government test was completed. These engines are now in service, having been released immediately upon Department of Commerce approval, and a second unit of fifty is coming off the line, with plans going into effect throughout the plant for production on a schedule of five engines per day.

The manufacturers of the Comet had a practical introduction to the requirements of modern flying through using airplanes to cover a sales territory that included practically the entire Northwest and particularly the remote lumber districts. This experience demonstrated the need of a power plant of moderate cost, which at the same time would have sufficient power to take a three-place ship over high mountain ranges and in and out of small landing fields surrounded by trees or other obstructions.



The Command-Aire

(Approved Type Certificate No. 53)

America's Finest OX-5 Motored Plane!

No expense has been spared to make the COMMAND-AIRE the safest, best performing and easiest OX-5 Motored Plane to fly, in America. How well this has been accomplished is best answered by steady increase of orders being received and number of orders on file yet unfilled.

Dealer franchises for this popular plane are still available in some territories. Full information supplied on request.

Arkansas Aircraft Corporation

Little Rock, Arkansas



MODEL 28 AIR KING

REFINEMENTS in detail have improved the appearance and performance of the Air King, the Model 28 representing a high development based on the practical experience of successful earlier models in the same class. The construction has been carefully engineered to incorporate details of proven strength and the resulting fine performance is obtained with no sacrifice in strength.

Welded seamless steel tubing is used for the fuselage with rigid steel truss members instead of brace wires. Outlines of the tail group are also of steel tube and the ribs are of steel channel sections; the stabilizer is adjustable in flight.

The landing gear is of the split axle type designed to withstand stresses nearly three times as great as ordinary landings impose. Streamlined aluminum discs are used on the wheels.

Solid spruce spars are used for the wing beams. Wing covering is with grade A1 fabric finished with three coats of plain dope and three coats of pigmented dope. In the external wing truss the loads on all rigging wires are directed to the centers of wing spars so as to eliminate eccentric loadings on them.

The pilot's cockpit contains the following instruments: Tachometer, ignition switch, water temperature indicator, altimeter, and oil pressure guage. Adjustable stabilizer control and throttle are within easy reach of pilot. Dual controls are installed. Control surfaces are balanced to give easy operation and positive action.

Windows are provided in lower wings to permit inspection of control cables. Wings and fuselage are wired for standard navigation lights.

Ailerons are unusually long and their large area insures control even at stalling speed.

The stock model is powered with the 90 h.p. Curtiss OX5 engine but provision is made for installing engines of greater power when desired. A Hartzel or Hamilton propeller is used. The tubular honeycomb type radiator is mounted below the upper wing. The entire engine is carefully cowled in and inspection doors provided for access to the carburetor, etc.

Specifications—Model 28 Air King

Span, upper wing	31 feet 2 inches
Span, lower wing	34 feet 1 inch
Chord, both wings	5 feet
Aspect ratio	6.2
Stagger	15 inches
Dihedral, lower wing	2.5 degrees
Dihedral, upper wing	none
Wing area	310 square feet
Airfoil section	Clark Y
Height over all	9 feet
Length over all	25 feet 5 inches
Weight, empty	1,340 pounds
Wing loading	6.80 per square foot
Speed, maximum	99 m.p.h.
Speed, cruising	85 m.p.h.
Speed, minimum	35 m.p.h.
Useful load	775 pounds
Fuel capacity	35 gallons
Radius at maximum speed	396 miles
Initial climb	600 feet per minute
Ceiling	15,000 feet

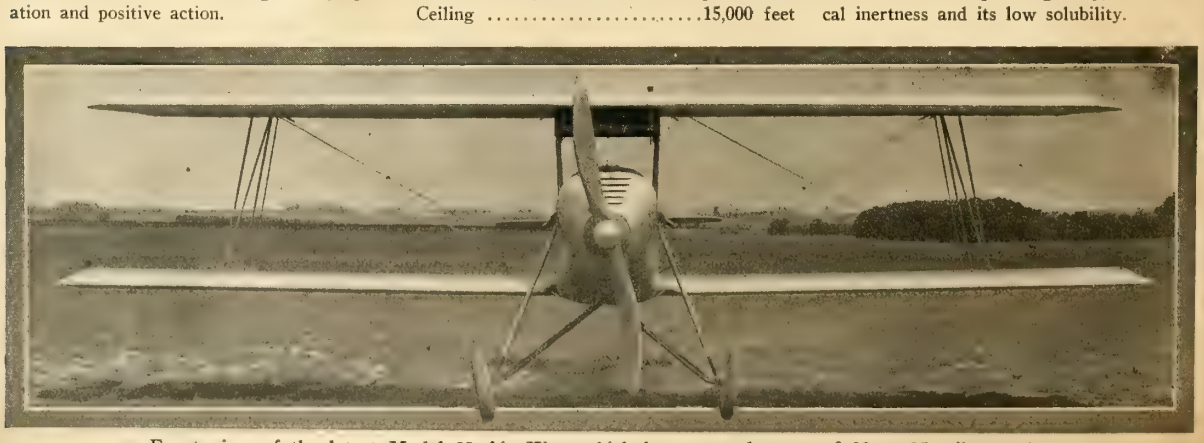
HELIUM IS AVAILABLE FOR COMMERCIAL USE

HELIUM gas, which has heretofore been considered a rare element and not obtainable on the open market, is now available in commercial quantities. Unusual interest is being manifested in its physical and chemical characteristics in the field of science and because of its unusual properties, it is expected that new fields of usefulness will be discovered and developed for the benefit of industry.

The gas was first discovered in the sun through spectroscopic observation by Janssen and Lockyear at the time of the solar eclipse of August 18, 1868. In 1895, Ramsey, searching for additional sources of the newly discovered element argon, discovered traces of helium in the mineral cleveite. Later, traces of helium were found in Canada and still later in France. It was observed that helium was always found in natural gas in the vicinity of minerals of a radio-active nature. During the World War, Doctor Ramsey suggested to our war department that they seek helium in certain natural gas fields where the radio-active minerals were present. His theory proved to be correct and the search for helium was successful. An extraction plant was then erected in Texas to supply helium exclusively for the use of the United States Government.

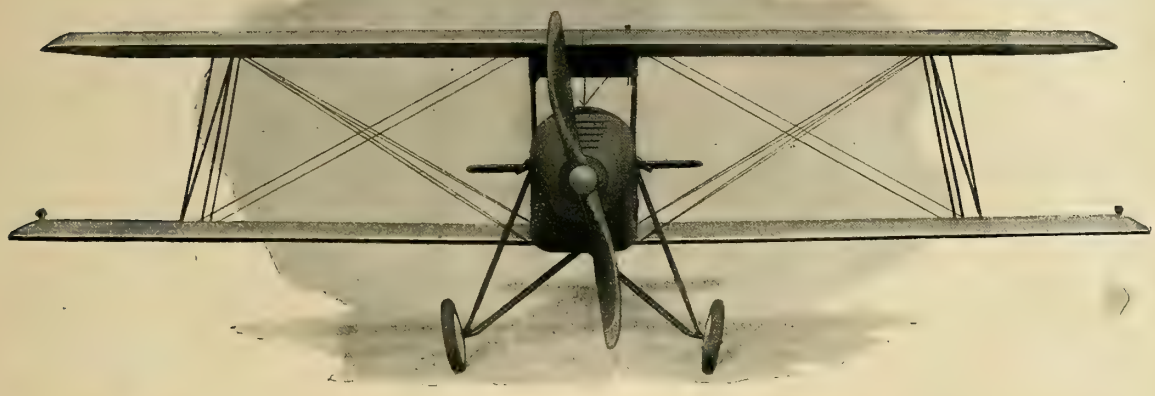
More recently, helium has been made available commercially by the discovery of new natural gas fields having a higher content and the development of an improved process of extraction by the Helium Company whose plant is at Dexter, Kansas, with headquarters at Louisville, Kentucky.

The first and most important use of helium to date is for inflating dirigible and passenger balloons because of its lightness and non-inflammability. Other developments are the use of helium to make a synthetic atmosphere of oxygen and helium for deep sea diving and caisson work involving labor under abnormally high pressure; in annealing processes and metallurgical operations as it is practically insoluble in water and in molten metals; as a damper for nautical and other scientific instruments because of its high viscosity and in many other fields because of its low specific gravity, its chemical inertness and its low solubility.



Front view of the latest Model 28 Air King which has a speed range of 99 to 35 miles an hour.

United States Department of Commerce approved type —Certificate No. 29.

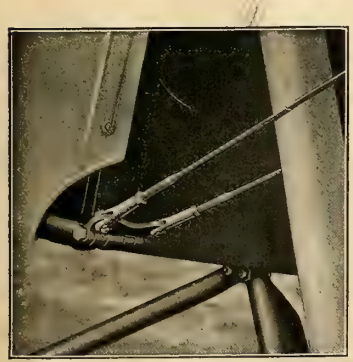




Air-King shock absorber struts are of hydraulic compression type.



Air - King under-carriage provides strength for the unskilled student flyer. Landing strain is absorbed and distributed to six points of the welded steel tube fuselage.



Flying wire fittings are securely welded to the steel fuselage, providing dependable strength.

Fast—Safe—Economical Payload Airplane for Students, Owners and Operators

Outside appearance is an indication of inside quality—the clean cut "Air-King" Model 28 is a wonderful piece of workmanship clear through.

Here's an airplane you will be proud to own and fly. Fuselage of seamless steel tubing; ventilated cowling; steel streamlined struts; shock absorbing under-carriage; streamlined flying, drift and load wires; aluminum disc wheels; full width wind shield; head rest and roomy cockpit are only a very few of its many advanced advantages.

Illustration above shows how completely "Air-King" engineers have cut down parasite resistance—providing speed with ease of control. Wide tread under-carriage protects wing tips in landing on uneven ground. Side sway is lessened. Full forward vision provides worry-free flying.

Positive lateral control (even at stalling speeds) is insured by long, narrow chord ailerons. Pilots will appreciate the complete dash equipment which includes: tachometer, contact switch, water temperature gauge, altimeter, oil pressure gauge. Adjustable stabilizer control and throttle are within easy reach. Finely balanced dual controls are provided.

Specifications of "Air-King" Model 28

Span, Upper Wing	31′ 2″	Length Overall	25′ 5″
Span, Lower Wing	34′ 1″	Weight, Empty	1340 lbs.
Chord, top and bottom	5′	Wing loading	6.80 per sq. ft.
Aspect ratio	6.20′	Speed, Maximum	99 m.p.h.
Stagger	15″	Speed, Cruising	85 m.p.h.
Sweep back	None	Speed, Minimum	35 m.p.h.
Dihedral, Lower Wing	2½ deg.	Useful Load	775 lbs.
Dihedral, Upper Wing	None	Fuel Capacity	35 gal.
Wing Area	310 sq. ft.	Radius, Maximum Speed	396 miles
Airfoil section	Clark Y	Climb, Initial	600 ft. per min.
Height Overall	9′	Ceiling	15,000 ft.

Just off the press—a supplement to our Air-King Catalog that describes fully Model 28 Air-King.

National Airways System, Lomax, Illinois

Field 8

THE LIGHTING OF AIRPORTS

By R. W. Cost
Westinghouse Lamp Company

TO be of commercial value airports must be lighted. The only economic advantage possessed by aviation as compared with other forms of transport lies in the time it can save, and unless the aviator can navigate accurately, locate his objective easily, and land with perfect safety in the hours of darkness, this advantage is largely lost.

Careful study and experience indicate that the following types of lighting equipment must be installed in any airport to be used at night:

1. *Beacon light,* to guide the flyer to the field.
2. *Boundary,* approach and obstruction lights, to indicate to the aviator the limits of the landing field, favorable points of approach, and dangerous obstructions, such as trees, pole lines, buildings, etc.
3. *Landing field floodlights,* to enable the aviator to see the details of the terrain on which he is to land.
4. *Hangar lights,* to floodlight the hangars and assist the pilot in judging his elevation above the field.
5. *Auxiliary lights,* including "ceiling" projectors, lights for illuminating wind indicators and other details, and lights for the interior of buildings.

Beacon Light

To mark the location of a landing field, some form of beacon uniquely distinguishable at all hours and visible to the aviator at a considerable distance must be used.

A source of light throwing a moving or flashing beam of several million candlepower has been found most suitable for this purpose.

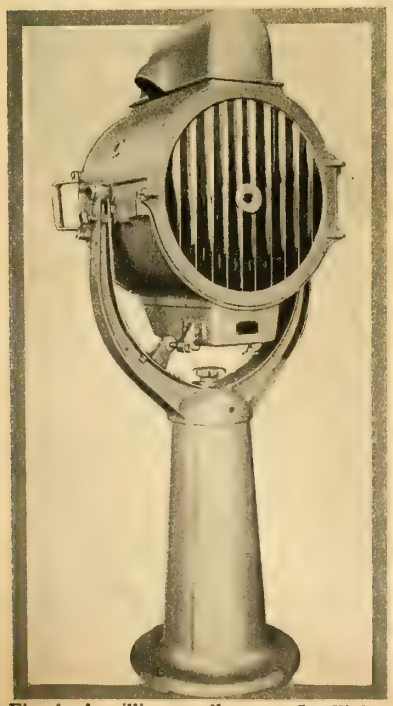
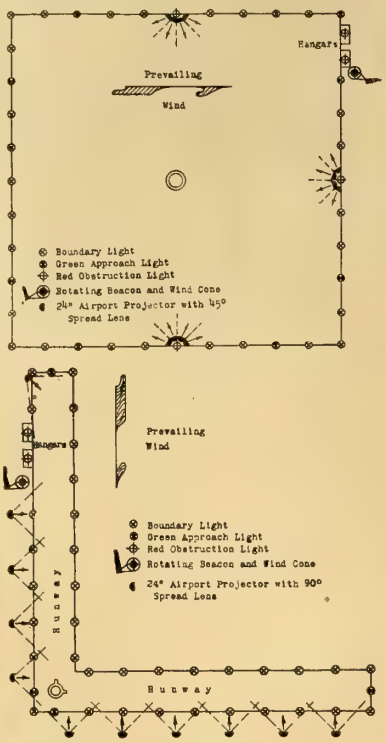


Fig. 4. A million candlepower floodlighting unit

The preferred beacon for airports and airways consists of a 24-inch rotating projector (Fig. 1) containing a 1,000-watt Mazda projection lamp with a concentrated filament. The voltage of the lamp depends upon that of the current supply, but 110 to 120 volts is common practice.

The projector has a silvered glass paraboloidal reflector, 24 inches in diameter. The enclosing drum is weatherproof and has no air chimneys nor ventilating ducts except breathing vents in the three-section glass front to equalize the temperature and prevent fogging. The cooling is accomplished largely by radiation.



Plan A(above) Landing field 2500 square feet
Plan B (below) Landing strips

The base contains a motor which, by means of reduction gears, rotates the drum at 6 flashes per minute in all azimuths. Slip rings are located in the base for carrying current to the lamp. An adjustment is provided to change the angle of elevation of the drum so that the axis of the beam may be raised above the horizon approximately one-half of the beam spread. So that the pilot flying at 2,000 feet or higher may not be above and out of the beam too soon (within 3 miles) on approaching the beacon, it has been thought desirable to have a beam spread of some 7.5 degrees. When rotating at 6 r.p.m., this would provide a flash of 0.2 second duration.

This unit is usually mounted on a tower or roof platform 40 to 50 feet above the ground so that the beam will clear all surrounding obstacles. The maximum beam candlepower of this beacon is approximately 4 million at good concentration, or a little over 2 million at 4-degree spread. With good weather conditions and narrow beam concentration, these beacons are visible to pilots at distances as great as 20 to 40 miles.

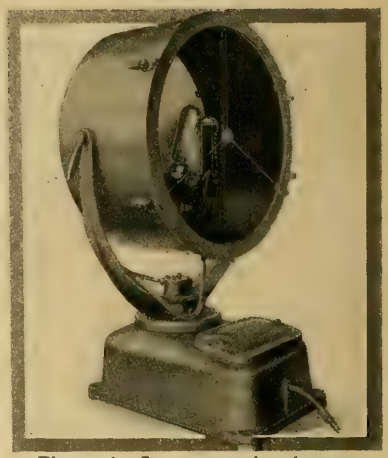


Figure 1. Sperry rotating beacon

Boundary, Approach and Obstruction Lights

The border of the landing field is outlined with lamps, commonly known as *"boundary lights"*, spaced at 200 to 300 foot intervals. An all-weather vapor-proof unit equipped with a clear glass globe designed particularly for this application is shown in Fig. 2, permitting the use of either series or multiple Mazda lamps for boundary lighting, and may be used either with or without the wire guard. Methods for installing either a series or multiple system are shown in Fig. 3, (a) and (b).

Where high potential alternating current, such as 2300 volts, is available, the series system, operating through a constant current transformer, is the best practice. It is important, however, where the series system is used, to employ the film cut-out mogul socket, so that in the event of a lamp failure the film will be punctured by the high potential and the circuit re-established. To safeguard life and property from coming in contact with the high voltages in the event a boundary lamp post becomes demolished by collision, the series lamp is connected through a safety coil located in the base of the post. The primary winding is connected in series with the high potential underground cable while the secondary terminals are brought up through the post to the lamp.

Favorable points of approach to the field are usually marked by a section of one or two green lights, commonly referred to as *marker lights* on the border. Where this distinction is desirable the vapor-proof units should be equipped with green globes.

All obstructions on or near the landing field, such as radio towers, pole lines, trees



New Plant of the Spartan Aircraft Company, six miles northeast of Tulsa. Accurately reproduced from a photograph taken August 19, 1928.

Dedicated to SAFE Construction



SPARTAN is powered with the world-famous WALTER Engine, manufactured at Prague, Czecho-Slovakia, and holder of five World's Records. Spartan Aircraft Company now controls the exclusive North American distributing rights for this engine and maintains complete stocks of parts at Tulsa and other distributing points.

THE NEW PLANT of the Spartan Aircraft Company, situated six miles northeast of Tulsa and one-half mile from Tulsa's new $400,000 Municipal Airport, is unquestionably one of the finest aircraft manufacturing plants in the world.

The plant consists of two buildings, a main structure, 116 feet wide and 340 feet long, and a dope and lacquering building, with special ventilating equipment, 30x80 feet. These buildings represent the initial unit of a projected $500,000 plant and are of the most modern type of permanent industrial construction.

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Span, 32 feet; length, 23 feet, 6 inches; height, 8 feet, 9 inches; weight, empty, 1150 lbs.; capacity, 3 persons and baggage, or pilot and 500 lbs. freight; maximum speed, 115 miles per hour; cruising speed, 100 miles; cruising radius, 600 miles; power plant, 9 cylinder, 120 H. P. WALTER radial, air-cooled engine.

SPARTAN'S new plant, as was the old, is dedicated to the ideal of SAFE airplane construction. Allow us to send you our new catalog in full colors.

SPARTAN AIRCRAFT COMPANY

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Figure 6. Elevation showing light control of Westinghouse air projector

and buildings, if within the normal gliding angle, should be surmounted with obstruction lights of which each unit is equipped with a ruby glass globe. Where the series lamp system is employed for boundary lighting, it is obvious that the approach and obstruction lamps may be tied in with that circuit. Lights which indicate the presence of obstacles should be mounted on poles of sufficient height so that they will be visible from all sides of the obstruction.

Where the multiple lighting system is used, each vapor-proof unit in a clear glass globe is equipped with a 25 or 40 watt Mazda lamp of the proper voltage. In the series system, the 600 lumen, S-24½ bulb, 6.6 ampere Mazda lamps are employed. Units equipped with colored glass globes employ larger wattage lamps to allow for light absorption in the colored media. Thus each colored globe unit feeding from a multiple system, is equipped with a 50, 60 or 100 watt Mazda lamp; and with a 1000 lumen, 6.6 ampere lamp if burned on a series lighting circuit.

All boundary and approach light units are ordinarily mounted on pipe standards about three feet in height. Each standard should be constructed as rigidly as possible, preferably imbedded in a concrete block as shown in Fig. 3 and painted white to indicate its location to pilots during the day.

Landing Field Floodlights

Ground surface conditions usually determine what methods of floodlighting are most desirable for landing field illumination. It is essential to have the field or runways as flat and smooth as possible, especially from a safety standpoint, and such level ground enhances the effectiveness of relatively low mounted projectors to sweep the surface with a thin layer of light. Pools of darkness may exist on the field if the terrain is wavy and if illuminated by light sources improperly placed.

When light is projected on a field, the sides of grass blades, pebbles, or earth particles facing the light source are much more brightly illuminated than the other surfaces. In brief, the vertical plane receives by far the greater intensity, varying perhaps from ten to several hundred times the illumination value on the horizontal plane, depending on the distance from the projector and its mounting height. Hence, such grazing projection must be very powerful if small surfaces inclined but slightly from the horizontal are to become visible.

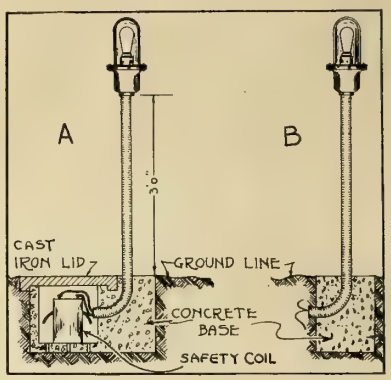


Fig. 3. Boundary and approach lights

The average amount of horizontal illumination required on a field or runway for night landing has been variously estimated from 0.03 to 0.3 foot-candle. Opinions of pilots regarding a desirable amount of light are much divided and apparently vary in proportion to their familiarity with certain landing fields. A provision of safety for pilots unfamiliar with any field should be made with a lighting installation which will illuminate the runways to an average intensity of one-quarter foot-candle. The illumination provided by relatively low mounted projectors will not, of course, be uniform and the intensity within a hundred times as great as that resulting at the limits of the effective part of the beam.

Ground color will vary on fields in different localities, ranging from dark earth or grass to light colored sand, and will have reflection factors approximately from 10 to 40 per cent. As objects are visible largely in proportion to the amount of light they reflect to the eye, it follows that ground color should influence to some extent the amount of light required. Lighting plans should take into account meteorological conditions and seasonal change in aspects of vegetation.

The ideal arrangement of floodlights for landing is to locate projectors on all sides of the field so that illumination can be provided for an aviator approaching from any direction. Such an installation involves a relatively high expense, however, and ordinarily projectors placed in proper relation to the prevailing winds are considered adequate. Portable floodlights which can be placed anywhere on the field on short notice, are employed at several fields, but the use of stationary equipment is more general.

Landing lights are supplied in both arc and incandescent types.

Arc Type—Fig. 4 shows one type of arc floodlighting unit employed for lighting a large expanse of field. It consists of a 55 ampere high intensity arc, automatically held at the focus of an 18-inch paraboloidal mirror. The front door, through which the reflected beam passes, consists of a spread lense which disperses the beam through an angle of 80 degrees in the horizontal plane, but confines it within an angle of 3 degrees vertically above the field. The spread light has a maximum candlepower of one million and the illumination from this unit is sufficient for the average size landing field. This type of projector is usually constructed of non-corroding aluminum alloy castings and although light in weight, it is very ruggedly built. The mechanism for striking the arc and feeding the carbons is entirely automatic and no attention is required during operation. One, two, or three of these units, depending on the expanse and general terrain contour of the area to be lighted, are mounted on a rigid platform 6 to 10 feet above the field.

This arc projector operates on 115 volt direct current. If only alternating current power lines are available, a small motor-generator set is employed to supply direct current.

Incandescent Type.—Four to twelve incandescent projectors with appropriate beam control, each equipped with a 1500 watt, or larger, Mazda lamp, assembled in one or more groups of four to six units, or spaced at two hundred to three hundred feet intervals on one or more sides of the field, will adequately illuminate the surface of a field for night landing of airplanes. Plan A shows a landing field 2500 feet square with the approximate location of the essential lighting equipment indicated by symbols in the



Fig. 2. All weather vaporproof unit



Fig. 5. A 300,000 candlepower projector



THE BERLINER MONOPLANE, a commercial and training plane ideally appointed for use by the private owner, has been designed by one of America's outstanding aeronautical engineers in collaboration with nationally known pilots. It is manufactured throughout from the highest grade of materials and built by skilled and seasoned airplane mechanics.

In service its clean lines, beauty and attractiveness of design prove again the adage that "Planes that *look right, fly right*". Although far more stable than other ships of its size, it has that maneuverability demanded by the most exacting pilots. The Berliner Monoplane gives maximum performance with minimum maintenance.

Every part of this monoplane has been designed as though it were the most important part of the ship, and has been engineered to reduce air resistance without sacrificing a single comfort or safety factor. The graceful and efficient cantilever wing, sturdy chrome molybdenum steel fuselage and husky fittings combine to make this the outstanding monoplane offered in the world's market for 1928.

Berliner Monoplanes are being produced in quantity under Department of Commerce approved type certificate No. 39. An ample number of new OX-5 motors are available. The plane is built to take motors up to 220 HP.

Price: With Curtiss OX-5 Engine, $3,290, Flyaway Hoover Field, Washington, D. C.

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BERLINER AIRCRAFT COMPANY
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Berliner Monoplane features are plentiful, including exceptional visibility, easy access to passenger compartment, ease of rigging, inspection and maintenance, interchangeable parts, readily removable radiator and gas tank, improved stabilizer control, and highly efficient hydraulic-spring shock absorber.

SPECIFICATIONS

Length overall, 25 feet 10 inches; height overall 8 feet; airfoil Goettingen 398; span 36 feet; area of wings and ailerons 219 sq. feet; weight empty, 1400 lbs.; gross weight loaded, 2300 lbs.; high speed (full load, sea level), 105 m.p.h.; landing speed, 41 m.p.h.; absolute ceiling, 16,000 feet.

legend. Landing strips such as shown in plan B can be satisfactorily illuminated by means of incandescent projectors equipped with suitable spread lenses installed along the borders. As the prevailing wind will determine the leg of the runway to be used for landing, a switch for separately controlling each row of projectors should be installed in the circuit.

The airport projector, illustrated in Fig. 5, represents a type of standard approved equipment for this service. It is built with a 23-inch paraboloidal reflector, a 45-degree spread lens, and when provided with a 1500 watt Mazda lamp, will emit a beam of over 300,000 maximum candlepower. Larger lamps may also be used in this projector, furnishing correspondingly higher intensities. A semicircular frame enclosing a system of louvers and held in place just behind the spread lens, prevents any light projection over 3 degrees above the horizontal.

Each projector is usually mounted on a pipe standard or in a small shed elevated 6 to 10 feet above the ground and the units should be tilted forward slightly to prevent any projection of light above the horizontal. In this position the projector will illuminate effectively an area for a distance of 500 to 2000 feet, depending on the size lamp and type of spread lens, and cause practically no glare to the pilot even when landing toward the light source. When a number of units are spaced at approximately 250-foot intervals with their beams projected across the field, the fan-shaped illuminated areas overlap at the edges and form a well-lighted path several hundred feet in width.

Hangar Floodlighting

To assist the pilot in judging his elevation above the field when landing at night, the exterior surface of each hangar is usually floodlighted by a system of 200 watt or 300 watt Mazda lamps equipped with industrial type reflectors and spaced on approximately 20-foot centers, or by an installation of floodlight projectors. The light from either installation also provides a fair degree of illumination around the hangar for performance of ground operations, as may be noted from Fig. 7.

Auxiliary Lighting

Interior Illumination—In order to conduct operations within the hangar during dark hours in the day or at night, it is necessary to provide general illumination, on the order of four foot-candles. The usual scheme for interior lighting of airplane hangars, imposed by reason of their roof construction, is the use of 300 watt 110-120 volt Mazda lamps in RLM dome reflectors, installed on the under members of the steel trusses on 15- to 20-foot centers.

Several convenience outlets should be installed on the side walls of the hangar to provide for extension cord connection to portable "trouble" lights.

Wind Indicators—In order to inform the aviator of the wind direction, some form of wind vane is usually installed and this should be illuminated at night. Cloth cones are lighted by means of four 100-watt A-23 Mazda lamps, set in deep-bowl porcelain reflectors and mounted at the top of the support carrying the wind cone. A red obstruction light surmounts the whole. Large structural weather vanes are lighted by means of 10-watt lamps, in green globes, mounted directly on the mechanism so as to outline it.

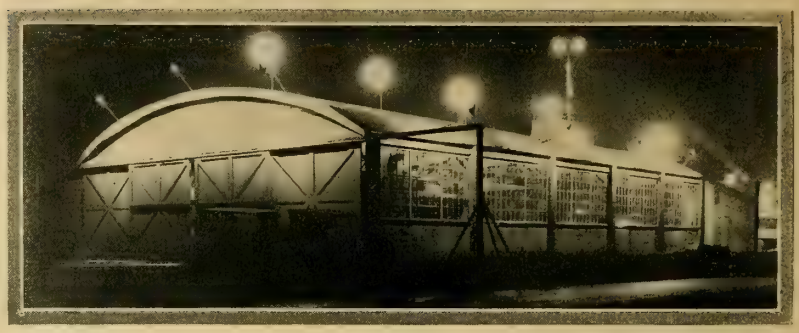


Figure 7. Exterior illumination of hangar with floodlights and reflectors

Ceiling Projectors—At a number of the fields on U. S. Air Mail Routes, a searchlight for determining the height of clouds or "ceiling" above the field, is included. With the light trained at an angle of 45 degrees upwards, the distance horizontally from the light to the point beneath the bright spot on a cloud stratum is a measure of the height. A knowledge of cloud height is desirable when the ceiling is low. This information is telephoned or sent by radio to neighboring landing fields for the benefit of approaching pilots. A 12- or 18-inch searchlight, equipped with a 500 or 1,000 watt Mazda lamp is usually employed for this application.

Field Markers—The Department of Commerce has recommended to the municipalities that the fields show distinctive marking both day and night. One method is to construct a circular trench some 100 feet in diameter, lined with white painted broken rock and covered with open mesh grating. Vapor proof globes spaced some 6 feet on conduit along the under side of the grating will, with 25 watt Mazda lamps, supply the necessary illumination. A field number may be prepared similarly.

THE STEARMAN RUBBER-DRAULIC LANDING GEAR

THE Stearman Rubber Draulic landing gear is designed to absorb the energy upon landing rather than store it up to be dissipated later. In the rubber-draulic, oil is forced through a small orifice, absorbing the kinetic energy set up by the vertical drop in landing. By this application of an established hydraulic principle the continued bouncing of a plane on landing has been eliminated. The hydraulic travel of the landing gear absorbs only those loads that occur at the time the weight of the plane first reaches the ground. Taxiing loads, after the landing is made, are carried on a single length of conventional rubber shock cord which is entwined around the gear in a way to use a maximum length in a minimum space. The total travel of the gear is eight inches of which the last two or three combine both the rubber and hydraulic principle. In combination as these two are, the trade name Rubber-Draulic was evolved.

The gear is built of alloy steel and aluminum alloy castings. It weighs less than many other gears designed to accomplish similar purposes, is efficient and provides an excellent precaution against damage due to severe or rough landing. To further the effectiveness of this gear, Stearman planes are equipped with 30 by 5 straight side casings that give an added cushioning effect.



Stearman rubber-draulic landing gear

SUMMERILL BOOKLET ON AIRCRAFT TUBING

THE 1928 edition of the aircraft tubing data booklet issued by the Summerill Tubing Company of Bridgeport, Penn., is a useful reference for designers, engineers and purchasing agents in aircraft factories. This booklet contains 16 pages of carefully arranged tables, charts and diagrams of streamline and square section tubes. Information is given on the physical properties and chemical compositions of the most widely used steels. Other lists give the weights per foot of round section cold drawn seamless steel tubing from $\frac{1}{8}$ inch to $3\frac{1}{2}$ inch outside diameter and in various gauges from number 36 to $\frac{5}{8}$ inch. A price list is also given for the various sections of seamless steel tubing.

The Summerill Company is glad to send a copy of their aircraft tubing booklet to aeronautical engineers and others concerned with the subject.

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Low wattage lamp ... Economical operation .... Employs Fresnel hand-cut lens .....

Type T-8

This latest B. B. T. Airport Floodlight can be used as a supplementary light to be mounted on top of either the Air Mail Type M-8-D or Intermediate Air Mail Type H-8-D Landing Floodlights or used for temporary illumination prior to the requirement or installation of a major floodlighting system.

AS a preliminary installation, an airport is able to light a section of its field so that night landings may be made satisfactorily and later on employ this new unit as a part of a complete floodlighting installation.

The construction and principle of operation of this new Type T-8 Floodlight is the same as in the larger Air Mail Floodlights all of which employ the hand-cut Fresnel lens for the 180° distribution of light with a sharp cut-off at the top of the beam.

This auxiliary light is also well adapted to the illumination of areas between the hangars and the lighted field for the handling and maneuvering of ships, passengers, mail or express.

A 2000 watt incandescent lamp employed as the light source means economy of operation and maintenance in addition to the low cost of the floodlight unit itself. Until you have actually seen or better still have landed by this floodlight no word explanation can adequately convey the intensity and area of the illumination produced.

Before installing any lighting equipment we cannot too strongly urge that you investigate this new dual purpose floodlight. Complete information will be gladly furnished together with catalog which should be in the hands of everyone interested in airport lighting equipment.

B.B.T. CORPORATION OF AMERICA

ATLANTIC BUILDING PHILADELPHIA PENNA.

WESTERN NEWS

CALIFORNIA AIRCRAFT OPERATORS ASSN.

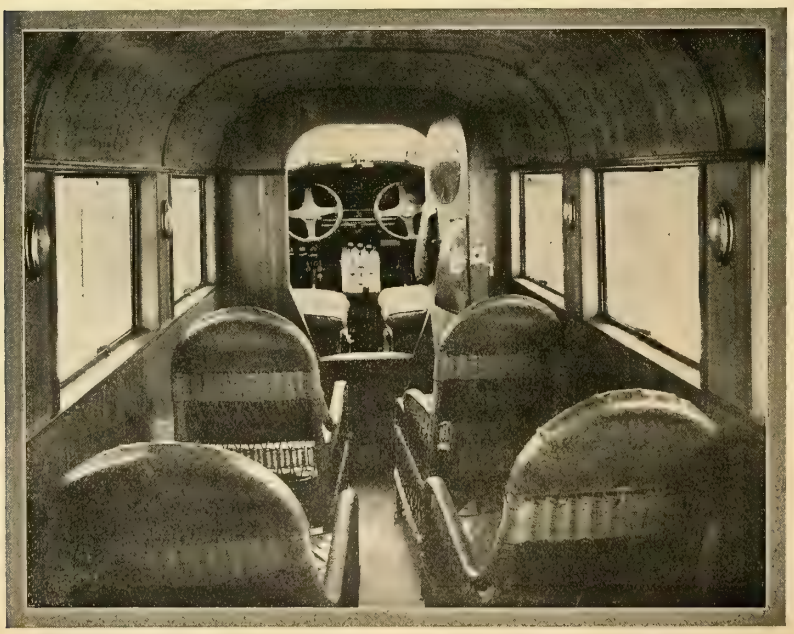
TOWARD the latter part of June of this year, a group of operators of commercial aircraft in Los Angeles got together at dinner to discuss some of their mutual problems. Contrary to some expectations they found that their competitors were human, were worried by the same problems of costs, and were thinking about the questions that confronted each operator, such as California's proposed tax on aircraft, the possibility of other detrimental legislation, and how best to stimulate the more general use by the public of air service. The individual operator found that the other fellow, instead of being a cut-throat, was a pretty likable chap and was really amenable to reason at times. So this meeting closed with every one feeling much could be accomplished if they got together regularly, and it was decided to meet again the following week.

At the second meeting a few more operators came over to see what it was all about. This led to the thought that perhaps a permanent association could be formed and a committee was appointed to look into the matter. This committee, consisting of Bob Blair, the Buhl distributor, Jim Webster of Rogers Airport, Ben Frank of the Ambassador Airways, and Jack Frye of the Aero Corporation of California, was to draw up a set of by-laws, inquire into the advisability of hiring a secretary, and otherwise proceed with the formation of a permanent organization.

A meeting was called for July 6, to which as many operators as could be reached were invited. Some fifteen firms sent representatives to this meeting. A plan of supporting the organization financially was worked out, a secretary employed, and tentative articles of association and by-laws were drawn up to be referred to an attorney. Major Tuller, counsel for Western Air Express, volunteered his services in this connection and the members were quick to avail themselves of his help. It was further decided to hold regular meetings every two weeks so that all the members could get together and thresh out their mutual problems more easily.

The association now numbers nineteen members and by the time this appears in print will probably have more than twenty-five members on its roster. Those who have already enlisted are: Aero Corporation of California; Ambassador Airways, Inc.; American Aircraft Corporation; Air-Flite, Inc.; Associated Aircraft Co.; Buhl-Pacific Aircraft; Ben Catlin Aviation; Chadbourne-Donze Air Service; Dycer Airport; Granger Aircraft Co.; General Aircraft Co.; Maddux Air Lines, Inc.; B. F. Mahoney Aircraft Co.; Eddie Martin Airport; Master Aircraft Co.; Mutual Aircraft Co.; Rogers Aircraft, Inc.; Shorts Airport; Wilson Aero Service. In addition it was decided to make the Chief Inspector of the Aeronautics Branch of the Department of Commerce, Captain Walter F. Parkin, an honorary member. This is the only honorary membership provided for—all other membership being limited to those firms or individuals doing a commercial aircraft business.

The association has opened offices at 6040 Hollywood Boulevard, Los Angeles, for the transaction of business of the organization. The officers are Bob Blair, of Buhl-Pacific, president; Jack Frye, of Aero Corporation, first vice president; Norman Sprowl, of Ambassador Airways, second vice president; Charles Dycer, of Dycer Airport, as secretary-treasurer; and Caden Jenkins as managing secretary.



Interior of Bach Air Yacht used on the West Coast Air Transport Lines.

UTAH AIR NEWS

By Glen Perrins

ARTICLES of incorporation were filed in the second district court by the Ogden Air Lines, Inc., recently, to carry mail, passengers and freight. The initial business enterprise of the company is to convey sweet peas from Huntsville to Chicago and bring passengers to Ogden on the return trip. A. P. Bigelow is president of the company.

FRED KELLY has been appointed chief pilot of Division No. 1 of the Western Air Express Company. Kelly will operate between Salt Lake and Los Angeles.

A SITE for a landing field at Milford, on the Salt Lake-Los Angeles air mail line, has been set aside and withdrawn from appropriation by the U. S. Land office. The field will be lighted and prepared for airplane landing.

OFFICIAL opening of the Tooele airport will take place within thirty days. A 2,000,000-candlepower beacon is being installed.

NORTHWEST AIR NEWS

By F. K. Haskell

FLYING a Travel Air plane, Fred Fauer won the free-for-all race from Portland to Hillsboro, Ore., in the Washington county air circus, making the course in 7 minutes and 27 seconds. Gordon Mounce finished second and Bev Clark came in third.

The race opened the day's program of aerial events arranged by the American Legion as dedication of the new airport recently donated to the city by Dr. E. H. Smith. Ten thousand witnessed the air circus.

Among the events and winners: Stunt contest—first, L. C. Goldsmith; second, Gordon Mounce; third, Lieut. Keadle.

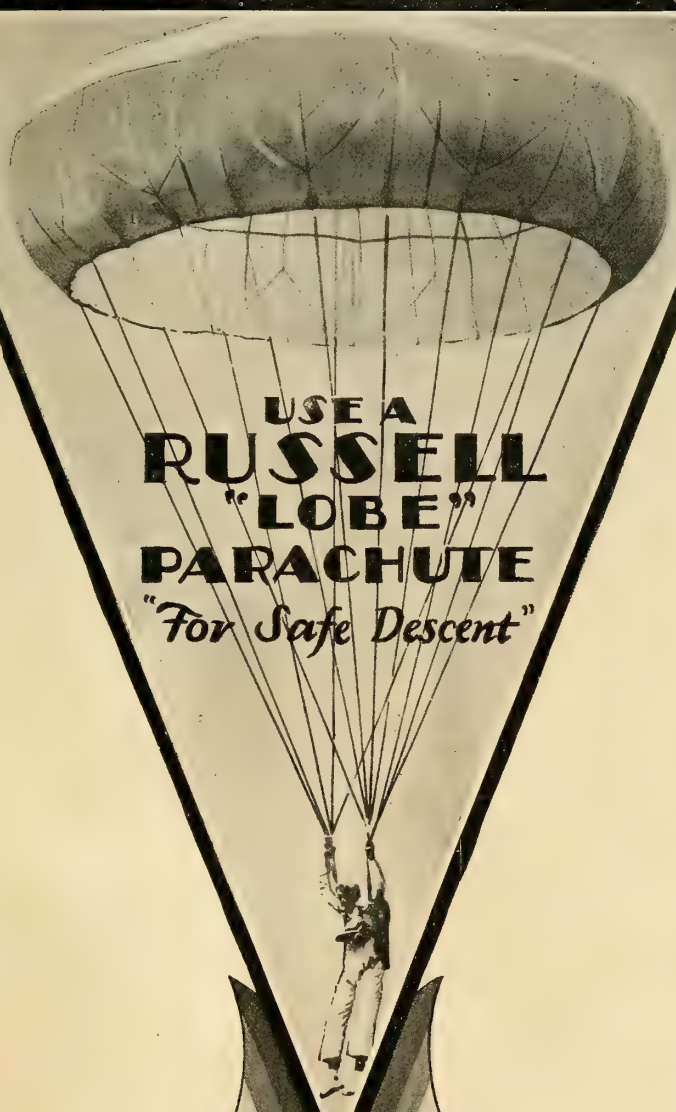
Fifteen-mile-race—first, Fauer; second, Clark; third, Davis.

Dead stick landing—first, Keadle; second, Grauk; third, Dick Rankin.

Free-for-all stunts—first, Case; second, Keadle; third, Langmack.

GORDON MOUNCE, Seattle air pilot, with two Seattle business men as passengers, recently made the first successful night flights across the Cascade Mountains between Seattle and Yakima.

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THE RUSSELL "LOBE" PARACHUTE PROVIDES THAT EXTRA FACTOR OF SAFETY!
Nothing left to chance—no rubber bands, no springs, no pilot chute. You simply pull the release ring and the parachute does the rest.
This parachute gives excellent performance even when packed by inexperienced persons. Furnished with lap, back, or seat pack—with comfortable, adjustable harness.

Manufactured by
RUSSELL PARACHUTE COMPANY
1202 Kettner Blvd. San Diego, California

CONTACTS

By Frank E. Samuels

WE wish we were able to give a life picture of the National Air Races, and especially the International Aeronautical Exposition held in conjunction with the Races, to those who were unfortunate enough not to be able to attend. The races included most of our best pilots and ships, both Army, Navy and commercial, and were full of thrills from the start to the finish. However, yours truly devoted most of his time to the exposition, which we believe was the greatest aeronautical show ever staged, and we feel certain that it will be a long time before it is equaled. Every exhibitor seemed to be striving to outdo the other in decorations and the general appearance of his booth and exhibits.

As representative of the west coast I am going to devote this space to the exhibits of the western manufacturers and representatives of eastern concerns who have offices on the coast, as much as I would like to mention every space holder at the show. On my many trips around the Exposition Hall I was greatly surprised at the great number of Western concerns represented and feel sure others will be equally surprised. Read the following list and marvel at the growth of the industry here on the West Coast in less than two years—

Booths

Security Mfg. Co., manufacturer of valves, pistons, bolts and screw machine products of Los Angeles. Theo. Koemer in charge of the exhibit.

Aviation Division of the Axelson Machine Co., of Los Angeles, manufacturer of the new 7-cylinder, radial air-cooled motor.

Redondo Booster Club and Manhattan Chamber of Commerce; reception booth.

Desmonds, the outfitters; exhibit of high class togs and aviation clothing.

Western Office of Rand McNally; full line of aviation maps.

Western College of Aeronautics, Los Angeles; reception booth in which they exhibited samples of their students' work on wings, motors, etc.

Miller Airplane Products; a show finished OX5 motor, equipped with the Miller overhead complete.

Y. M. C. A. of Los Angeles; reception booth.

Educational exhibit of aviation books, presided over by Lieut. Wm. P. Williams.

Kug-Art Studios, of Glendale, Calif.—"Photos by Rich"; display of aviation photographs.

Cohn-Goldwater Mfg. Co., manufacturer of flying togs.

Spence—Airplane Photos; a display of aerial photography, R. E. Spence in charge.

Los Angeles Branch of Spalding Bros.; flying togs and equipment.

Al Ebrite Aero Corp., and Albatross Aircraft Corp., both of Long Beach, Calif.

Sidney Aviation Sales of San Francisco with "Sid" Buegeleisen himself in charge.

Brownstein-Louis Co.; "Stronghold" aero mechanic slipovers and flying suits.

Scully Bros., of Los Angeles; air mail helmets and leather coats.

Proutyline Products Co., of Long Beach, Calif.; Metlox letters for roofs of hangars and field beacons. Harry E. Moon, representative at booth.

Southern California Chapter N. A. A.; reception booth.

Rankin System Flying Schools; reception booth, "Tex" Rankin and staff in charge.

Ambassador Airways, of Los Angeles; reception booth.

California School of Aeronautics, Kelly Airport, Hawthorn, Calif.; reception booth, with Mr. Kelly, who piloted the little "Dill Pickle", his wife and mother in charge of the booth.

"Famous" Army and Navy department store; full line of flying togs.

Aeronautical Division of the National Automotive and Electrical School.

M. E. Hulse, of Oakland, Calif., manufacturers' representative; instruments, goggles, and other aeronautical supplies, M. E. Hulse himself greeting.

Western Auto Supply Co.; aviation togs and supplies.

Jacuzzi Bros., of Berkeley, Calif., manufacturers of the Jacuzzi Bros., propellers. R. Jacuzzi, president, in charge.

Pacific Radium Application Co., of Los Angeles; radium for all instruments.

Heath and Heath, of Los Angeles; airplane radiators and oil coolers.

Eno Rubber Corp., of Los Angeles, representatives for the Oso-Soft air cushions.

Spillane & Co., of Los Angeles; airplane equipment, parts, etc. C. R. Catchpole in charge of the booth.

S. H. Knight, Los Angeles representative Follmer-Clogg Company, manufacturers of parachutes and parachute silk.

Alhberg Bearing Co. of Calif., with headquarters in Los Angeles. F. C. Griffin in charge of the booth.

Los Angeles Branch W. B. Huber & Co.; Jahns pistons.

Pacific Scientific Co., of Los Angeles, representing Pioneer instruments.

B. G. Corporation; spark plugs, etc.

Richfield Oil Co., of California; Spanish effect reception booth.

C. C. Ludlow, Western representative "Anzani" airplane engines.

Timm Airplane Corp., of Glendale, Calif., airplane builders. Both Wally and Otto were at the booth most of the time.

Automotive Sales, Inc.; replacement parts. Carl F. Fersch in charge of booth.

Los Angeles Fireworks Co., furnished the fireworks for the show. W. Wilson in charge of booth.

Monoplane Aircraft Co., of Los Angeles; reception booth.

Kinner Airplane & Motor Co., of Glendale, Calif., manufacturer of the Kinner 5-cylinder, radial motor; Martie Bowman and Mrs. Bowman in charge of the booth.

Aluminum Alloy Casting Co., of Los Angeles; aircraft cylinders.

Menasco Motors Co., of Los Angeles; complete motor exhibit with Al Menasco in charge explaining its good points.

Tsungani Piston Co., Suncani pistons and true edge piston rings. George F. Pease, factory representative, in charge.

West Coast Distributors of Szekely 3-cylinder radial motor, with Clyde A. Burt, western representative, in charge.

Pacific Aeromotive Corp., of California, authorized Wright Whirlwind service and distributors Scintilla magnetos, Stromberg carburetors, Consolidated instruments, and many other supplies necessary to the industry; Palmer Nichol in charge with a number of assistants.

Aircraft Holding Corp., of Culver City; their little 6-cylinder valveless 2-cycle radial, 80 h. p. motor. M. F. Murray, in charge with Joe Murray.

Hallett Aero Motors Co., manufacturers of the Hallett 7-cylinder, air-cooled radial motor; engine expert always on hand to explain the engine.

Associated Oil, of California; artistic booth.

American Aircraft Corp., supply department; display of helmets, goggles, etc. W. C. Brown in charge.

Russell Parachute Co., of San Diego; display of parachutes, packs, belts, etc., with Mr. Haas, factory representative, in charge.

Crawford Airplane Supply Co., of Venice, Calif.; full line of airplane parts and motors of almost every make. J. P. Ernster in charge.

Aero Corporation of Calif., supply department; display of helmets, goggles and a full line of aeronautical supplies. Jack W. Duelks, sales manager, in charge with Fred Hattoon and others to assist.

The Aeronautical World, a new trade journal of Los Angeles; reception booth.

Standard Oil Co. of California; reception booth.

Slate Aircraft Corp., of Glendale, Calif., manufacturer of the Slate all-metal dirigible; a model of the ship with a lecturer to explain its construction.

"Eagle" toy all-metal monoplane, with Ray Ellis, West Coast representative, in charge.

Essig Aero Advertising Service, with Al Essig in charge.

Aero Service Co., of Los Angeles, with Wm. M. Britton, representative of the western region, in charge; exhibited the "Orange Steel Hangar" and the Byrne lift type door, both in miniature.

San Diego Chamber of Commerce; reception booth and photographic display.

Rogers Pattern Shops, of Los Angeles; aluminum castings, wood and metal patterns. Albert E. Rogers, in charge.

King Zonne Co., of Los Angeles; display of electric tools.

Lennox Community, "The Gateway to the Air"; reception booth. Mrs. A. J. Crunelle, in charge.

Fyr-Fyter Pacific Co., Ltd., Los Angeles Branch; a full line of fire extinguishers.

Shaw-Palmer-Bakewell Co., of Los Angeles; iron, sheet metal and wood working machinery; Wm. C. Moffat in charge.

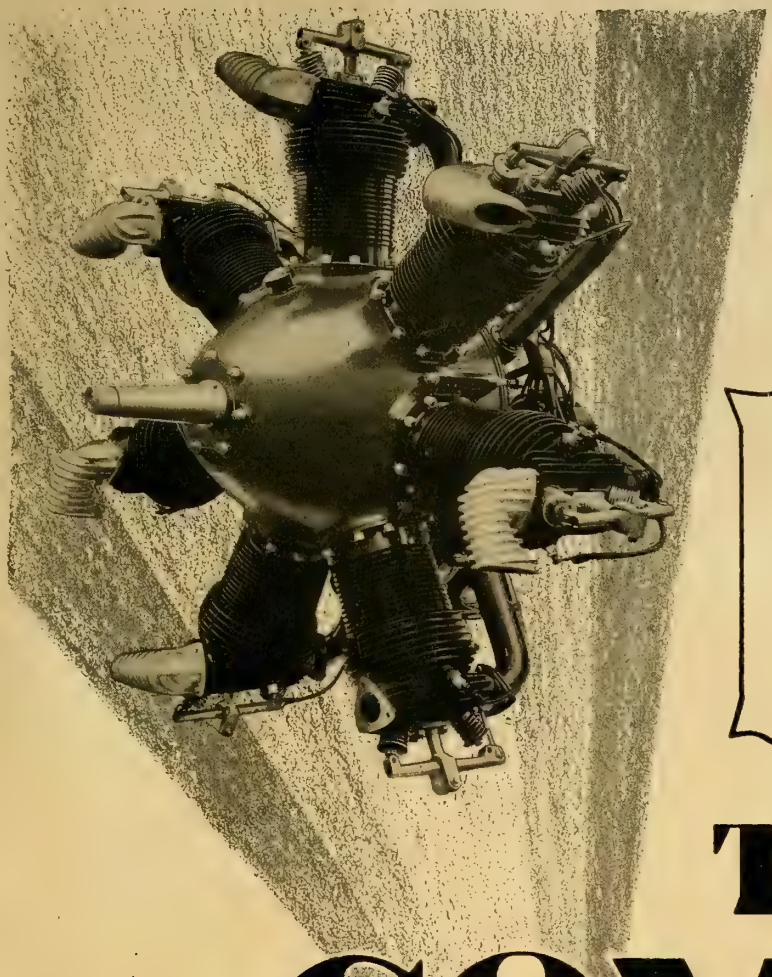
Maddux Air Lines; reception booth.

Boeing Airlines; reception booth, with Eric Nelson in charge.

Lafayette Aero Club, of Los Angeles; reception booth.

Owens Valley Airports; a unique booth, photographs and models of the country adjoining their airports in the high Sierra resorts.

(Continued on next page)



Specifications

150 h. p. at 1800 r. p. m,
Bore, 4½ in.
Stroke, 5½ in.
Displacement, 612 cu. in.
Weight dry, 375 lbs.
Outside diam., 46½ in.

Shipped completely equipped

THE COMET

AVIATION · ENGINE

The Comet AVIATION ENGINE has been approved by the Department of Commerce after completing the official, fifty-hour test in five days, running ten hours a day, without a forced stop and without even a minor adjustment. Shipments are now being made for installation in single-, twin- and tri-motored airplanes, and the production line is now being tooled up rapidly to meet the urgent demands of the light aircraft industry.

[*Complete information will be sent on request*]

AIRCRAFT ENGINE COMPANY · 1709 East Twelfth Street · Oakland, California

(*Contacts continued*)

The Stoody Company, of California; "compressed gas", a novel exhibition.

Featherlike Pneumatic Products, of Los Angeles; airplane cushions, life preservers, automatic valves for balloons, etc.

Arrowhead Spring Water; reception booth.

B. Hayman Co., Inc., Western distributors for the McCormick-Deering industrial tractors, used at Mines Field.

Los Angeles Community Clubs; reception booth.

Bartlett Nu Products Corp., Azusa, Calif.; concentrated food products for fliers.

Hollywood Aero Club, of Calif.; reception booth.

Murphy Varnish Co., Western Branch; Harry A. Garner in charge.

Warren School of Aeronautics, of Los Angeles; reception booth.

L. A. Metropolitan Airport; a unique booth, with Dean Hyskell and Anne Wyckoff in attendance.

Western Flying, aviation magazine of Los Angeles.

Pacific Finance Corp., and Rule & Sons, Inc., combined their efforts in a reception booth, both firms having west coast representatives.

Professional Pilots Association; reception booth.

Hannatoy, Inc., wholesale manufacturer of flying model airplanes. Edwin M. Hanna, president, Walter A. Withrow in charge of booth.

Oakland Municipal Airport; reception booth and layout of the airport.

Short's Airport of Los Angeles and Short's Flying School; reception booth with Mrs. Short in attendance.

Standard Mercantile Co., Inc., of Los Angeles; full line of flying togs, boots, etc. S. Lippitz in attendance.

J. H. Meyers & Co., of Los Angeles; trophies and aviation jewelry. Mr. Stell in booth.

T. C. Ryan Aeronautical Corp., and Pacific Technical University, both of San Diego, Calif.; booth, with Earl D. Prudden in charge.

Harris & Frank, of Los Angeles; a full line of aviation togs, helmets, goggles, etc., with J. E. Suerken in charge of the booth.

San Diego Air Service Corp. and School of Aviation; photographic display and reception booth with W. A. Speer in charge.

Joseph Kreutzer Corp., of Los Angeles, who have taken over the Brown Mercury Corp. and are starting an aviation flying field; reception booth with A. P. White in charge.

Marshultz Optical Co., of Los Angeles; display of goggles, helmets, kodaks and aviation accessories.

Los Angeles Branch of U. S. Department of Commerce; educational exhibit—flying regulations, rules, enlarged maps, etc.

Allen, The Decorator, of Los Angeles, the show decorator.

Nick Harris Detective Agency; booth.

Angelus Steel Treating Co.; metal airplane parts.

Constantian Bros., rental studios of Hollywood; exhibit of rugs.

Hollywood Moonbeam Aeroplane Landing Lights; exhibit of lights.

Pacific Fire Extinguisher Co., Western representatives of the Phister Mfg. Co.; a full line of fire extinguishers and equipment.

Monrovia Air Club, representatives for aviation magazines. Wm. L. Satterlee, Russell Berry and J. J. Englehart in attendance.

S. F. Bowser & Co., Inc., Los Angeles Branch; fueling system, electrically controlled and operated.

Virginia Bridge & Iron Co., Los Angeles Branch; who erected the hangars and pylons for the races on Mines Field.

Warren School of Aeronautics; parts for airplanes, instruments, etc., used in instruction work at the school.

The Boothe Company, of California, jobbers of aluminum and aluminum alloys; display of aluminum products.

Aluminum Company of America, West Coast Branch; samples of their products.

California Panel & Veneer Co., of Los Angeles; booth with Bob (Slim) Mulholland in charge.

Stoody Co., manufacturer of the Stodite tail skids, where Captain Bill Frye of Long Beach was to be found most of the time.

Airplanes

Aeromarine Klemm Corp.; an AK-L25 seaplane, equipped with a 40 h. p. 9-cylinder Salmson engine; and AK-L 25 landplane, equipped with a 40 h.p. Salmson 9-cylinder air-cooled engine; also an AK-L20 landplane, equipped with a Mercedes 20 h.p. engine.

Arkansas Aircraft Co., Herbert Miller, So. California and Arizona distributor; the Command-Aire, OX5, 90 h.p. biplane.

James Granger; So. California distributor for Swallow; an OX5 and a Whirlwind motored Swallow and the French Hanriot biplane, formerly owned by Charles Nungesser.

Maddux Air Lines; their latest trimotored Ford all-metal monoplane; J-5 Whirlwind motored.

Stinson-Detroiter, Whirlwind-motored cabin plane.

"Ace", a low wing monoplane, built, owned and operated by Essig Aero Advertising Service, motored with a Ryan-Siemens engine.

The "Woolaroc", the Travel Air cabin monoplane which was flown by Art Goebel to Honolulu.

H. C. Lippiatt, So. California distributor for Travel Air; OX5 Travel Air biplane.

San Diego Air Service; a new Warner Scarab-motored three-place Travel Air open biplane.

Harry Sperl Aero Corp., distributors; a new Curtiss Robin OX job.

American Aircraft; Whirlwind motored Waco, a Fairchild cabin monoplane and a pure white Waco suspended from the ceiling.

Three-motored Bach air transport with its "Nite Coach", sleeping compartment companion, for two-day ocean-to-ocean transcontinental runs.

Federal Aircraft, of San Bernardino, Calif., exhibited for the first time their two-place and pilot monoplane, cabin job, "Wings of Steel", also a complete framework of the construction.

Golden Eagle Monoplane Co.; one of their little one-place three-cylinder motored sport monoplanes.

Prudden of San Diego had their latest Wasp-motored, all-metal, six-passenger monoplane on exhibit.

Boeing Airplane Co., of Seattle, Wash., one of their Wasp motored, mail and passenger transports, also a twelve passenger, three-motored transport demonstrating on the field.

Joseph Kreutzer Corp., Larry Browns' latest three-motored open monoplane. Larry is now connected with the Kreutzer Corporation.

The Douglas Co. unveiled their first three-place Whirlwind-motored, commercial monoplane. A new departure for the company is the building of commercial airplanes.

Western Air Express exhibited their latest Pratt & Whitney Wasp trimotored, twelve passengers and two pilots, monoplane built for the San Francisco-Los Angeles air route.

The Crown Motor Carriage Co., Inc., through their aircraft division, introduced their new Kinner-motored three-place job.

Star Aircraft Co. showed for the first time in the west, the little two-place, Velie-motored, cabin monoplane, the Cavalier.

Rogers Aircraft Corp., of Los Angeles; a beautifully finished, three-place Stearman biplane, motored with a Wright Whirlwind.

Lockheed Aircraft; one of their stock model, Whirlwind-motored Vega monoplanes.

Mutual Aircraft Corp., of Los Angeles, exhibited for the first time, the B. F. Mahoney brougham, convertible for land or seaplane.

Aero Corporation of California, an Alexander OX5 motored Eaglerock, a complete skeleton frame of an Eaglerock with a seven-cylinder Hallett air-cooled motor mounted on its frame, and an Eaglerock wing frame.

Bob Blair and the Pacific Buhl Company; a complete Buhl Airsedan fuselage and landing gear frame set up ready for covering.

Prof. Merrill showed for the first time his little fool-proof plane, the "Dill Pickle".

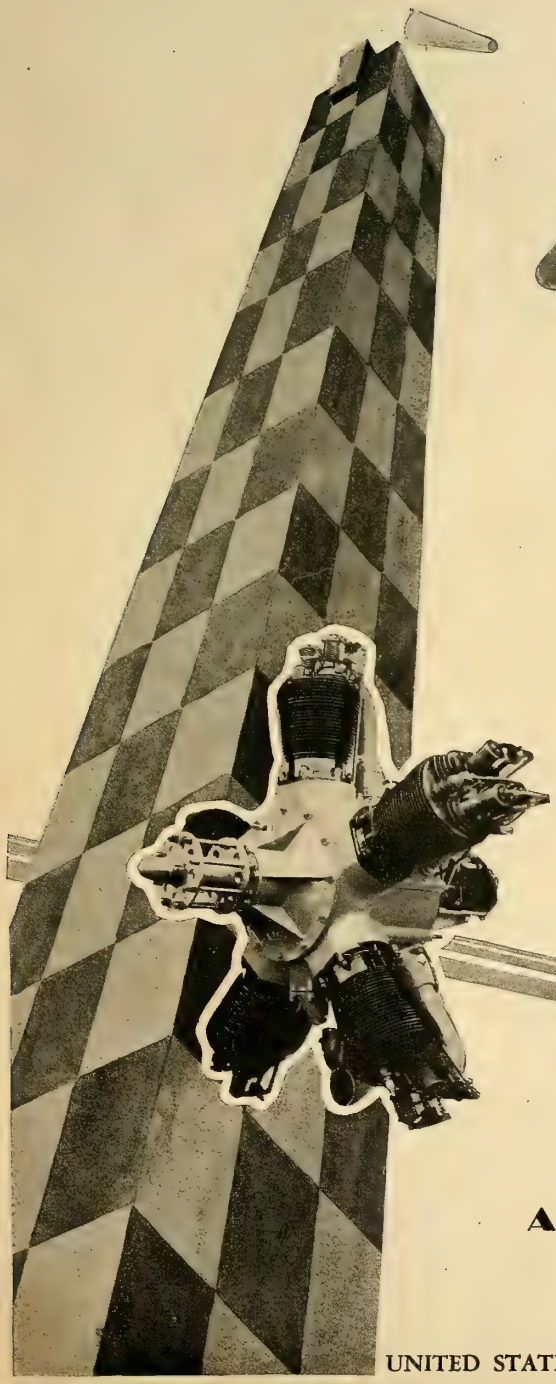
Thunderbird Aircraft Corp., distributors, exhibited a show finished Thunderbird.

Running an exposition with the National Air Races was an experiment and the committee must be given credit for the courage they displayed in undertaking it and the successful manner in which it was staged. The committee arranged a big program to draw the crowds, hoping that a percentage of the visitors would be prospects for the exhibitors. But the races and outside program took up so much of the time during the days and evenings that the visitors had very little time to inspect the booths and exhibits in the exposition building. While the races were on, the exposition building was practically deserted.

We must not blame the committee, however, as they thought that they were helping the exhibitors by putting on an exceptionally interesting air program to draw the crowds. However, expositions and air races run at the same time and place, are not practical.

KINNER POWERED SIMPLEX WINS CALIFORNIA CLASS "A" RACE





IN HEATED COMPETITION with sixteen other planes, a Kinner powered Red Arrow Simplex Monoplane won the Class "A" California Race between San Francisco and Los Angeles, one of the feature events of the 1928 National Air Races, in the fast time of 3 hours, 10 minutes, 20 seconds with an average speed of approximately 126 miles per hour.

From the starting line in San Francisco to the pylon at Mines Field, Los Angeles, this Kinner Powered plane, piloted by Dick Myhres, *led the entire distance.*

That this was the *only* Kinner motor entered in the race . . . that it was a *strictly stock* Kinner K-5 Five Cylinder Radial 100 Horsepower Motor ...that it *maintained the pace* all the way under almost continuous *full* throttle stands as a tribute to the dependability of Kinner performance

KINNER

AIRPLANE AND MOTOR CORP.

Builders of Quality Airplanes and Motors Since 1919

GLENDALE, CALIFORNIA

UNITED STATES DEPARTMENT OF COMMERCE CERTIFICATE No. 3

CALIFORNIA AIR NEWS

A COURSE in commercial aviation covering the economics of aeronautics is to be offered, for the first time, this fall semester in the College of Commerce and Business Administration of the University of Southern California.

In charge of Earl W. Hill, head of the department of traffic and transportation at the University of Southern California and educational director of the Western Air Express, the air transport study course will cover history of aviation, types of aircraft, types of motors, government and state regulations, mail, express, and passenger service, rates and operating costs, airways, airports, safety devices, and government inspection, dealing with aviation from a service and investment point of view.

CLOSELY following its selection by the Curtiss-Robertson Airplane Manufacturing Company as all-Western distributor for the Curtiss Robin monoplane, the newly organized Harry Sperl Aero Corporation of Los Angeles has been appointed Pacific Coast distributor for the Lockheed Vega.

Dewey Rickenbacker, brother of the famous "Eddie" of World War fame, will be general manager of sales for the new corporation; Evelyn Wolfram, secretary and treasurer; and Bob Alexander and E. I. Erickson, coastal representatives handling retail sales and dealer contracts.

DAILY round trip service is now available on planes of the Western Air Express between San Francisco and Los Angeles.

A plane leaves Oakland airport at 8:30 a. m. and arrives at Vail Field, Los Angeles, at 11:30 a. m., and leaves Los Angeles on the return journey at 2:30 p. m., arriving back at Oakland at 5:30 p. m.

The plane leaving Los Angeles at 8 a. m. arrives at Oakland at 11 a. m. and starts the return journey at 3 p. m., reaching there at 6 p. m.

TO raise money for the instruments needed in his proposed round-the-world flight, Lieutenant George Pond recently hopped sight-seers at the Oakland municipal airport. Major Livingston Irving, who is planning a trans-Pacific flight from Oakland to Tokio, loaned Lieutenant Pond his cabin monoplane for the occasion, and 102 persons took advantage of the opportunity to aid the flier.

On his round-the-world flight Lieutenant Pond will fly an all-metal amphibian which is being built in Detroit. He will follow much the same route as the Army fliers did and expects to "circumnavigate" the globe in 12 days.

EVERY moment of day and night finds one or more mail planes in the air on the routes of Boeing Air Transport, transcontinental, or Pacific Air Transport, coastwise. Thirty Boeing planes and 36 pilots are maintained to insure this ceaseless flight.

THE Marchetti Motor Company has purchased a factory site adjoining Mills Field, San Francisco, and construction work on the new $300,000 factory is expected to begin immediately.

The company expects to produce in the first year 1,000 motors and 100 airplanes. The engines will be the new type developed, invented and patented by Paul Marchetti, Italian-born San Franciscan, which has no crankshaft, timing gears or camshaft.

William Aiken Rider, formerly with General Motors and the U. S. Steel Corp., is general manager and chief engineer of the company. S. S. Sorrenti will be in charge of the airplane manufacturing and of the factory.

The officers of the company are: Paul Marchetti, president; Dr. R. P. Giovanetti, vice president and secretary; Peter Lippi, treasurer, and the following directors, Captain A. I. Eagle, U. S. A., Paul Belli, G. Gianni and Frank Santina.

UNION AIRLINES, INC., operator of the West Coast Air Transport Company and the Pickwick Airways, Inc., has taken over the Capital Airlines, Inc., of Sacramento. H. Clay Bernard, vice president of the Union company, states that service will be continued between San Francisco, Oakland, Marysville, Chico, Fresno and other valley cities.

THE system of fueling planes from pits has been inaugurated at the Oakland municipal airport. Two companies already have installed the new type equipment, and three other concerns are making plans for similar installations. All gasoline delivered is measured by meter, so that a constant check on the gasoline sold is available to the airport management.

MAJOR BERNARD FOSTER, British war ace, is training an air squadron for China's nationalist army at Oakland municipal airport.

Lee Jan Sun, 19, brother of General Chang Kai-Shek, commander of the South China troops, has organized the volunteer air unit in this country. The youth already has enlisted more than a dozen fellow countrymen. When their training is completed they plan to go back to China and join the nationalist army.

CAPTAIN DAVID DOTY has been elected president of the Oakland Airport Pilots and Operators Association Major Livingston Irving was made first vice president; George Ream, second vice president; Robert Bowman, secretary; Milo Campbell, assistant secretary, and Ed Greer, treasurer.

LIEUT. COMDR. GEORGE O. NOVILLE, U. S. N. R. has accepted an appointment as technical director of the Union Air Lines, Inc.

Noville's headquarters will be in San Francisco. He will exercise complete supervision over the engineering, mechanical and routing departments of the Union organization. The latter now operates regular air passenger schedules through the West and has launched a big expansion program to spread its service all over the nation. Noville also will be in charge of the personnel of Union Air Lines pilots.

Noville will make a three-months' survey of air transportation lines and the aircraft industry generally in England, France, Germany, Italy, Russia and other countries.

Among the aeronautical achievements participated in by Noville which have brought him international renown were the U. S. Army round-the-world flight, Byrd's North Pole expedition, the Byrd transatlantic flight, several aeronautical enterprises of the U. S. Navy, and as squadron commander in the Italian army during the Austrian offensive. In 1920 he served as superintendent of the U. S. air mail service.

Plane Carries Repairs to Big Grain Harvester

THE Cousins Tractor Company recently received a telephone order for "Caterpillar" tractor parts from A. H. Wolfsen, large grain farmer, whose vast plantations are in the middle of what used to be Tulare Lake. Pilot Cal Calahan was summoned by phone from the Visalia airport, and twenty minutes after the harvester man had ordered his parts, they were en route south in his Travel Air biplane, with C. C. Selby, tractor salesman, and Frank C. Webb, photographer, as passengers.

The plane landed alongside the harvester and delivered the parts, accomplishing a feat hitherto thought impossible, owing to the nature of the ground, made rough by irrigation canals. The harvester was located on soft ground in almost the center of Tulare Lake basin, about 20 miles west of Corcoran. (*Continued on next page*)



Travel Air plane bringing tractor repair parts

L. A. METROPOLITAN AIRPORT

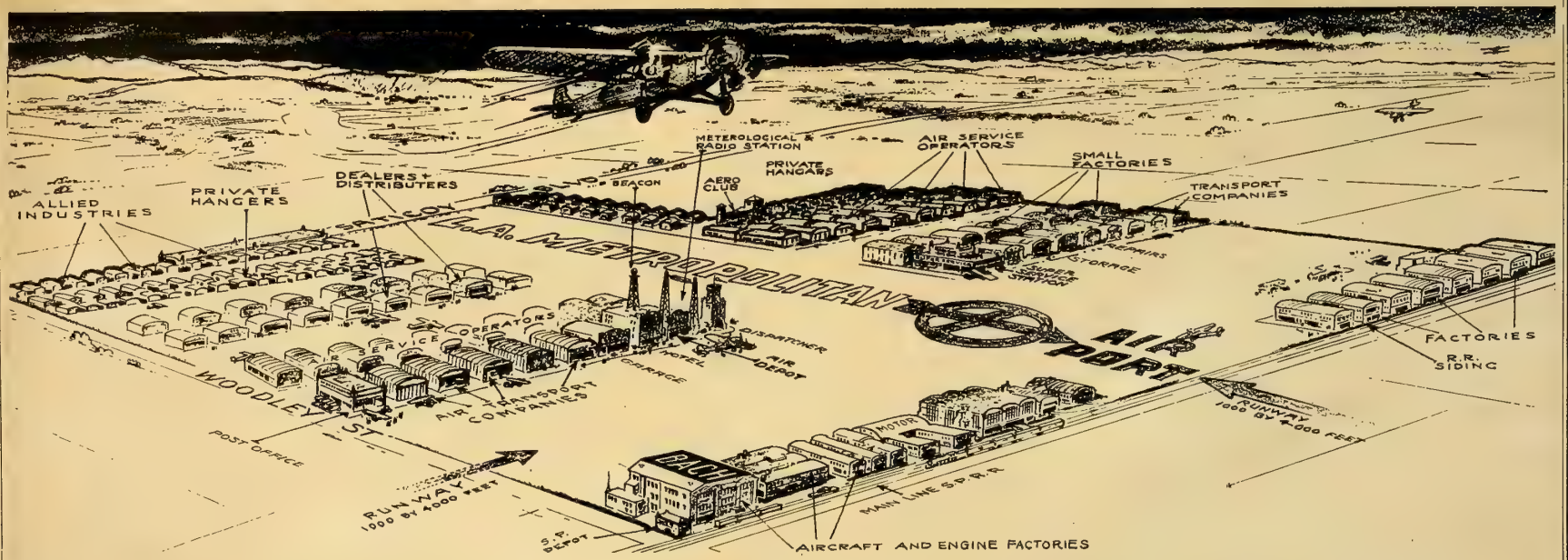
Opening October First, at Saticoy and Woodley Streets

SAN FERNANDO VALLEY, CITY OF LOS ANGELES.

Offices 411 Hollywood Security Bldg., Cor. Hollywood and Cahuenga Blvds.

LOS ANGELES, CAL. *Gladstone 1165*

Booth 258, Aeronautical Exposition, Los Angeles, Sept. 8-16



Reservations now on file for twenty-six sights, from Bach Aircraft Co.; O. W. Timm Airplane Co.; West Coast Transport Co.; Richfield Oil Co.; Pacific Aeromotive Corp.; Shelton Aero Service; H. C. Lippiat; Roy Wilson; Eagle Flying School; Crown Airplane Co.; Granger Aircraft Co.; R. C. Miller.; Adrien Cornell; Standard Airlines, Inc.; Briggs Airplane Company; Continental Maping Company, Geo. R. Craig Co.

Contracts have been let and construction started on our first buildings, sodding runways, lighting system and grading.

Sights may be leased, purchased or leased with option to purchase on this field, the first permanent airport in Los Angeles.

L. A. METROPOLITAN AIRPORT CO.

Say you saw it in AERO DIGEST

(California Air News continued)

BIG BEAR CITY AIRPORT is located at a 7,000-foot altitude in the San Bernardino Mountains, and lies directly between Big Bear Lake and Baldwin Lake. It affords a level landing field which extends about a mile in length. The airport is near several vacation resorts located in that region of the mountains. Mr. Jefferson W. Asher, of Los Angeles, who was with the 298th Aero Squadron during the war, headed the project for establishing this airport.

THE University of Koenigsberg, Germany, through Dr. Otto Schreiber, dean of its air law department, recently conferred an honory degree of doctor of laws on Col. Warren Jefferson Davis, of San Diego. According to Dr. Schreiber, this is the first time the university has ever awarded such a degree in the field of air law. Colonel Davis received this honor because of his extensive study of aviation and radio law, concerning which he has already written several books. Last year he attended the international radio congress at Geneva as observer for the federal radio commission. He is a member of the air law committee of the American Bar Association.

A $300,000 policy in favor of the California Air Race Association was issued by the Independence Indemnity Company of Philadelphia through its aviation insurance underwriters, Barber and Baldwin, Inc., of New York. The policy provided public liability and property damage insurance for the national air meet held September 8-16 at Mines Field, Los Angeles, and covered the period from September 1 to 23.

A SERIES of six lectures on air law, under the sponsorship of the Union Oil Company, was recently given at the University of California by Dr. Otto Schreiber of Koenigsberg, Germany. Dr. Schreiber had previously delivered similar lectures at the University of Southern California. The lectures at the University of California were conducted under the auspices of the university school of jurisprudence. It is hoped that these lectures will contribute toward the clarification of the increasingly complex problems of aeronautical law.

THE number of passengers carried on local sightseeing flights by the Aero Corporation of California from January 1st to August 15th, 1928, numbers 11,989.

AT the re-election of officers recently held at the Aero Corporation of California, Walter A. Hamilton was elected vice president in charge of operations. Other officers are: Jack Frye, president; Paul E. Richter, Jr., treasurer; E. R. Chisholm, secretary.

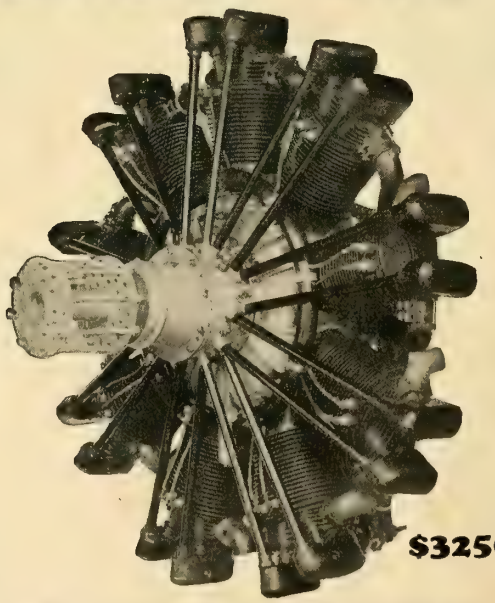
AS winner of the Southern California airplane model contest, Bangs Tapscott, age 14, has been awarded a tuition to the Aero Corporation of California flying school by Captain Eddie Rickenbacker of world war fame. Bangs is believed to be the youngest student enrolled at any flying school in California at the present time.

ONE of the most successful improvements in the line of test stands has been developed by Walter A. Hamilton of the Aero Corporation of California. This stand has only one motor bed and such other attachments as make it possible to use the same test stand for running-in radial, V type, or rotary motors.

THE Aero Corporation of California has recently taken over the distributorship for Hamilton propellers in the states of California and Arizona.

AT a family reunion recently held at the home of Philip Jones of Redondo Beach it was found that only two members of the four generations represented had never been in an airplane. After dinner, negotiations were made to rent a Fokker plane from the Aero Corporation of California for one hour at which time Mrs. Mary K. Hanby, age 93 years, and Barbara Ann Jones, age 6 years, had their first flight. Other members who were on the flight were: Mrs. Fred Jones, Mr. Philip Jones, Miss Marguerite Jones, and Miss Winifred Howe. The plane was piloted by Lieut. Paul E. Richter, Jr. *(Continued on next page)*

MENASCO MOTORS



MODEL B2 $3250 LOS ANGELES

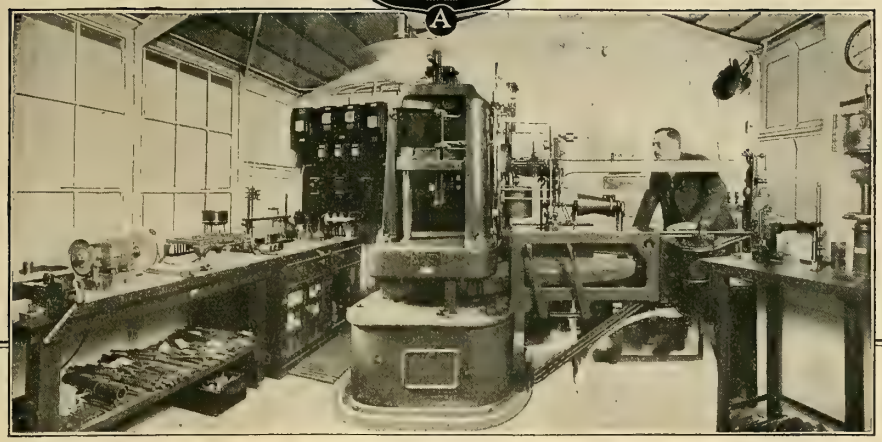
MENASCO MOTORS CO.

6718 McKINLEY AVENUE LOS ANGELES, CALIF.

Say you saw it in AERO DIGEST

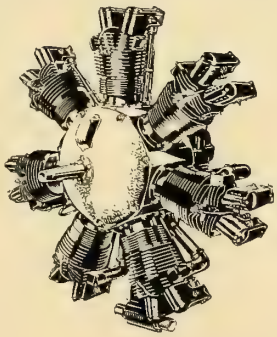
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Stands Behind Axelson Dependability!



POWER PLANT dependability is often a question of the physical strength of metal.

When an emergency arises and your motor must deliver its maximum power... when racing pistons are forced to share the tremendous force of almost constant compression with cylinder heads... when connecting rods must take the full brunt of terrific power suddenly unleashed, the difference between successful flight and motor failure is metallic stamina.

Endurance strength of all metals used in the Axelson motor are predetermined in a fully equipped plant Laboratory. Materials must meet a definite static and dynamic physical specification. An analytical check for chemical elements is daily routine. Etch tests and microscopic examinations are invaluable as double checks for the soundness of material.

The characteristic response of various parts to specific heat treatments is checked by the use of the above pictured Laboratory equipment.

AXELSON MACHINE COMPANY

Airplane Motor Division

POST OFFICE BOX 337, LOS ANGELES, CALIFORNIA

Say you saw it in AERO DIGEST

(California Air News continued)

AL WILSON, star of forty-five film "thrillers" and one of the outstanding stars of the recent international aeronautical exposition and air races at Mines Field, Los Angeles, has been signed by Maddux Air Lines to pilot one of the Ford trimotored airliners on regular California-Mexico-Southwest service.

Wilson, the premier living stunt man of the Pacific coast aviation world, has given up stunts. "Once in awhile I'm going to take leave of absence for a little workout in Hollywood studios," he said. "But the biggest thing in the world today is the development of safe, sane and reliable air transportation. It is bigger than all stunts, greater than all thrills."

HAVING moved into their new location at 9201 South Western Avenue, and all set for business, an extensive advertising campaign is to be carried on throughout California, Arizona, Nevada, Utah and Idaho by the Thunderbird Sales Co., and dealers appointed throughout the above territory.

The personnel of the Thunderbird Sales Company is made up of well trained men, each a specialist in his own line—V. D. Boller, vice president and pilot, formerly of March Field and Aero Corp. of California; Sterling Boller, chief pilot, recently from the Advanced Flying School at Kelly Field, Texas; Charlie Witmer, sales manager, former air mail pilot with the Pacific Air Transport; Clinton Herberger, pilot, Lieutenant in the Army Air Service Reserve and Forest Patrol; Jack Latour, pilot and in charge of personnel, formerly with the Aero Corporation of California; and Dana Boller, pilot in charge of publicity and student enrollment. Lee Schlens, president of the Thunderbird Sales Company, recently left the University of Southern California to accept the presidency with the above company.

Besides the selling of the Thunderbird aircraft, a complete school of instruction is to be maintained, as well as passenger flights and cross-country hops.

Aeronautical Courses
University of Southern California

THE United States Department of Commerce, the United States Navy, and the aeronautical industries of southern California are coöperating with the University of Southern California in the development of an aviation curriculum.

The schedule of the College of Engineering offers classes in aeronautical engineering under Lieut. E. D. Koger, U. S. N. R. Plane parts from the U. S. Navy Air Station at San Diego are being used for demonstration purposes. This course in airplane instruction includes both lecture and laboratory study.

The service and investment phases of aviation—that is, the business of aviation—are taught by Earl W. Hill, Educational Director of Western Air Express, vice president of the International Institute of Traffic, and author of "Aeroplane Transportation". This study is offered in the College of Commerce and Business Administration of the University.

The University's School of Law has announced a new course in Air Law under Dr. Rudolph Hirshberg of the Institute of Air Law at the University of Koenigsberg, Germany. Dr. Hirshberg is acting as exchange professor for Dr. Fred Fagg, who is to spend a year at Koenigsberg where he has access to the research library on air law.

In addition to those courses already mentioned, night classes in legal, mechanical, and commercial aviation are conducted at the downtown division of the University, and lectures on airplane transportation are included in the University's radio educational program this fall.

New "Caterpillar" Small Model

THE Caterpillar Tractor Company has announced the "Caterpillar" Ten Tractor, production and sale of which will begin early in 1929. This new model, designed especially for users of small tractors, offers ten horsepower at the drawbar and fourteen horsepower on the belt. It weighs approximately 4,000 pounds, and measures about 100 inches in length and less than four feet in width. The radiator cap, the high point of the tractor, is approximately 51 inches above the ground. Otherwise, it embodies most of the usual features of Caterpillar tractors.

A preview exhibit of Model Ten was offered at the California State Fair at Sacramento, California, September 1st.

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In THE MOST PERFECT FLYING COUNTRY IN THE WORLD

We give instruction in new Waco Tens

Primary Flying Course $250

Private License Course, 10 hours solo 400

Commercial License Course, 50 hours solo 950

Air transportation anywhere, with SPEED COMFORT and SAFETY

CHADBOURNE-DONZE AIR SERVICE
Santa Barbara, Cal.

(Airport, Carpenteria, Cal., 10 miles east of Santa Barbara)

DEALERS FOR WACO, FAIRCHILD AND DRIGGS AIRPLANES

OX5 pistons, new, per set, $19.50
OX5 pistons, high compression, each, $4.75 (semi-finished or .005 oversized)
OX5 long cyl. stud No. 3862, each, $ .15
AC and Splitdorf Spark Plugs, each, $ .30
Fire Extinguishers, Fyrfyter, 1 qt., each, $5.75
Helmets, imported cape, reg. $6.50, each, $4.50

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Built by E. M. Laird Airplane Co., Chicago

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Flying Field and Hangar: Long Beach Municipal Airport
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Say you saw it in AERO DIGEST

Three Sea Hawks



SAN DIEGO'S THREE SEA HAWKS, Lieutenants Tomlinson, Davis and Storres, at the National Air Races, gave the world a new conception of flying skill. Their marvelous loops, barrel rolls, and Immelman turns and geometric V formation showed the result of their thorough training and diligent practice in San Diego.

Every day the air above Lindbergh Field in San Diego gives a constant demonstration of the highest development in the art of flying. The fact that the Navy's "Three Sea Hawks" and the Army's "Three Musketeers" and the World's Greatest Pilots were developed in San Diego, is conclusive evidence of Leadership in the field of Aeronautical training.

The San Diego Air Service Corporation, in establishing its School of Aviation on Lindbergh Field, has combined San Diego's unparalleled advantages for Aviation training with instruction of Military exactness in the development of Commercial pilots.

You are invited to train on Lindbergh Field, America's finest airport, and secure the thorough training prerequisites to mastery of the air. A booklet about *Air Service Training* awaits your request.

SAN DIEGO AIR SERVICE CORPORATION
LINDBERGH FIELD **San Diego, California**

Please send me complete information about Air Service Training.

*Name*_____ *Address*_____



A group of Monocoupes lined up at the new Rankin Airport, Portland, Oregon.

OREGON AIR NEWS

New Rankin Field

As a result of the added interest in the Rankin System of Flying Instruction, tremendous increase in enrollments has made necessary the securing of a larger field and the erection of hangars, shops and school buildings by the Rankin School of Flying, Portland.

But a short drive from the downtown business center, the field will be used also for transport work. Arrangements are being made for providing hangar accommodations for owners of planes, where complete shop and service facilities may be had.

It is believed that the new Rankin field is one of the few Class A fields privately operated on the Pacific Coast and perhaps the only one in the Pacific Northwest. This four-way field, with short-runways 2,900 feet in length and the long run-ways measuring 3,500 feet, allows ample room for planes of any size to take off and alight.

ARIZONA AIR NEWS

A NEW aviation school has been started at Nogales, on the international border. E. C. Koehler and B. M. Cole are conducting this school, and are also operating taxi service about Southern Arizona and the West Coast of Mexico. Mr. Koehler spent a month flying for the Mexican government prior to opening the school, and is considering a regular service down the West Coast.

WITH 27 army, navy and civilian planes in attendance, the Ernest A. Love field was dedicated at Prescott, on August 26. The field was named in honor of the first Arizona flier to give his life to his country. This field is the third to be dedicated in the state during the past two months, other fields being at Yuma and Flagstaff.

ANOTHER plane, an Eaglerock, has been added to the planes stationed at the home port of the Aero Corporation of Arizona, Phoenix. The plane was piloted to this field by Charles Goldtrap, chief pilot for the company. During the period of its operations, this company has carried between two and three thousand passengers on 1,500 flights. They now have a class of thirty students in their flying school.

A SECOND plane has been added to the equipment of the Southwest Air Service, with headquarters at the municipal field, Tucson. This company, recently organized, is headed by Bert Cosgrove, Travel Air distributor for Arizona and New Mexico. Del Jones, former world war flier and instructor at Langley Field, Va., is vice president and in charge of instruction. Harold Durham is secretary of the company, which plans to operate a flying school and run regular lines throughout the two states, and to the Gulf of California.

ERNEST WICKERSHAM, Safford banker and pioneer air enthusiast of the Southwest, has been honored by the

(*Continued on next page*)

One of the outstanding features
of the
National Aeronautical Exposition

The FEDERAL CM-3

A three place enclosed monoplane built around the Hallet Engine



"WINGS *of* STEEL"

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National Distributors for
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BRILLIANT and reliable performance, proven endurance, unusual economy, and unprecedented advertising which has made the name a by-word the world over, have won for the *Ryan Brougham* unquestioned *leadership* in the Whirlwind cabin plane field. For particulars, consult the

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The T. C. Ryan Flying School Offers All the Advantages of San Diego . . .
"Air Capital of the West."



INDIVIDUAL . . .

instruction is of paramount importance to the student flyer. The fact that classes at the T. C. Ryan Flying School are limited to ten students working under one specially trained, competent instructor again emphasizes that the Ryan Ideal---"To Produce the Nation's Finest Pilots"--is ever kept foremost in this school of specialized service . . . . A complete catalog fully describing the T. C. Ryan Flying School, its equipment, courses and faculty awaits your request.

The T. C. Ryan Flying School is operated under the personal supervision of T. Claude Ryan, president of T. C. Ryan Aeronautical Corporation and founder of all Ryan aviation industries in San Diego.

T. C. RYAN *flying* SCHOOL

Affiliated with Pacific Technical University . . . . San Diego, California

I am interested in your course of Flying Instruction. Please forward your catalog.

NAME_____ **ADDRESS**_____

Say you saw it in AERO DIGEST

(*Arizona Air News continued*)

Graham county chamber of commerce, which has named the Safford airport "Wickersham Field". Mr. Wickersham was a captain in the 158th Infantry during the world war, and has been interested in aviation for many years, owning his own plane and boosting aviation throughout the southwest.

AJO, small mining camp in western Arizona, was officially represented at the air show in Los Angeles by Miss Johnnie Shackleford, who won the title of "Miss Ajo" in a popularity contest for this honor, staged by the aviation committee of that place. She and her sister were given free air rides to the coast, with all expenses at the show paid.

THE city council of Tucson has approved requests of four aviation companies for leases at the municipal field. These were requested by the Standard Air Lines, which operates a regular line between Tucson and the coast; the Southwest Air Service, Mayse Air School, and Scenic Airways, Inc., which makes its summer headquarters at the Grand Canyon. The leases are to be given for a nominal sum, thus encouraging aviation activity.

HONOLULU AIR NEWS

By Verne Hinkley

AN end to the long army and navy controversy over the occupancy of Ford Island, Pearl Harbor, on which both services maintain an airdrome, is in sight

Federal legal officers here have received instructions from Washington to coöperate with army authorities in arranging, at the earliest possible date, a real estate transaction which will give to the army a tract of land containing 2,296 acres, valued at $1,145,000.

On this area, near Fort Kamehameha, a new army flying field will be built. While army officials are loath to discuss the question it is definitely understood that upon the completion of the new plant the air corps will abandon Luke Field, and Ford Island will revert to the navy.

The action hinges on a bill passed by the last congress which authorizes Dwight F. Davis, secretary of war, to cause condemnation proceedings to be inaugurated to acquire the area necessary for the new field. Although the appropriation of $1,145,000 has been authorized, the actual funds will not be forthcoming until the next congress convenes in December and passes on the matter.

The property sought is in two sections both of which lie to the south of the Pearl Harbor road and extend to the Fort Kamehameha reservation. The ground, portions of which are marshy, is being filled with materials from the Pearl Harbor dredging project, now well under way.

DEMONSTRATING that troop movements by air are speedier than by other means and that they are entirely practicable if properly engineered, the 23rd Bombardment Squadron, of Luke Field, recently transported 110 men 40 miles across the island of Oahu to the army's summer camp at Waimanalo.

Seven bombers and a Douglas transport ship were used in the maneuver which was completed within six hours. On each of the several trips made by the ships, from 300 to 1,000 pounds of freight was carried in addition to the pilot and three men in full marching equipment. The total deadweight moved exceeded 20 tons.

AIRCRAFT played an important part in the Hawaiian observance of the sesquicentennial of the landing of Captain James Cook, R. N., in these islands. For the special ceremonies which were held on the islands of Kauai at Waimea where the discoverer first set foot on these shores 150 years ago last January, ten planes flew across the 100-mile channel separating Oahu from the Garden Island. Among the ships was the army's trans-Pacific Fokker carrying E. E. Spafford, the national commander of the American Legion. The plane was piloted by Major Henry J. F. Miller, commanding Wheeler Field, with Lieut. Clyde Rich as co-pilot.

Navy planes making the crossing were piloted by Lieutenants W. F. Cunningham, L. E. Heath, J. H. Gowan and Petty Officer J. C. Wilson. In the ship flown by Lieutenant Cunningham was Comdr. V. D. Herbster, commanding the naval air stations at Pearl Harbor.

ARMY and navy aircraft put on a fine welcoming show for Dwight F. Davis, secretary of war, when he arrived the morn-

(*Continued on next page*)

SALES AND SERVICE

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CAN I LEARN TO FLY?

NOW – You Can Answer This Question to Your Own Satisfaction!

In order to Help You answer the above question, we have prepared a simple tentative EXAMINATION QUESTIONNAIRE consisting of twenty-five SOUND QUESTIONS on preliminary Aeronautics—If you can answer these questions correctly—YOU CAN LEARN to FLY. *Send for Your copy of this FREE Questionnaire Today!*

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Please send me without obligation on my part—Examination Questionnaire—CAN I LEARN TO FLY?
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ENGINEERING
is responsible for the marvelous performance of airplanes.

Requirements for entrance are High School credits in Mathematics and Physics or equivalent.

Special preparatory coaching is given those deficient in these subjects.

Twenty-four months instruction to complete the engineering course.

Why not choose aviation — a field that is retarded only by the fact that there are not enough competent men to fill the positions.

Before you enroll elsewhere a visit to the Western College of Aeronautics will convince you.



Wm. J. Waterhouse, A.E., C.E.
Dean

Courses of study taught—Engineering, Mechanics, Ground Work, Flying, Navigation.

Write for information

WESTERN COLLEGE OF AERONAUTICS
154 West Slauson Ave. Los Angeles, Calif.



A corner of our workshop showing students at work on motor overhaul

(Honolulu Air News continued)

ing of August 13 as a passenger aboard the *U. S. S. Pennsylvania.* The secretary came to Hawaii as the president's representative at the Cook sesquicentennial celebration.

Amphibians and PW9s took the lead in the show which was also participated in by the Fokker.

PLANS for the development of the John Rodgers airport, Honolulu's commercial flying field, as a fan-shaped area have been abandoned and the field, instead, will be widened and lengthened to such a size that it will be able to accommodate with all safety the trimotor commercial planes which it is believed will be in operation on an inter-island airline within another year.

Under the new specifications the field will be 500 feet wide and 2,500 feet long, a size specified by the Department of Commerce as the A1A type. The existing runway is 250 feet wide at one end, 350 feet wide at the other end and 1,850 feet long.

COLORADO AIR NEWS

By R. C. Cleminson

PLANS are under way for the purchase of the land adjoining Lowry Field on the south and east side, thus enlarging the field a full half-mile on each side. At present the field is being used by the 45th Division A. C., Colorado National Guard, Western Air Express, A. E. Humphreys, Jr., and the Continental Oil Company The Humphrey plane is a Fokker Universal Special piloted by Lt. Eddie Brooks, while the Continental Oil plane is a Ryan brougham, piloted by Captain Carlos Reavis.

A NEW hangar is being put up at the Denver Union Airport by the Sunbeam Air Transport Company of San Antonio, Texas. Homer D. Ballard and Matthew Watson, who is president and pilot, organized the company. They have recently ordered a Ford trimotor to be delivered about November 15.

COLORADO AIRWAYS, of Denver, has recently secured the agency for Waco planes.

MRS. ANTHONY F. JOSEPH, wife of the president of the Colorado Airways, has recently organized a flying club for women. She hopes to have 15 members in the next two months. Mrs. Joseph has had 18 to 20 hours of solo and is the only licensed woman flier in Colorado.

FLOYD CLYMER, of Denver, has opened an airport at Du Pont. He is operating a flying school and passenger service and has the agency for Swallow planes.

THE Colorado National Guard recently received three new Douglas 02-H Observation planes for their squadron at Lowry Field. The boys are certainly piling up time on these new ships.

THE value of quick mountain air mail connections was brought home to eight Colorado cities September 11 by an Eaglerock airplane, powered with a 90 h.p. OX5 motor, which flew 255 pounds of air mail from Montrose across the Great Divide to Pueblo in three hours, landing at six towns en route. It was the first air mail ever carried eastward from the Colorado Western slope. The terminal cities are separated by a two days' drive over rough mountain roads.

The plane, belonging to the Pikes Peak Air service, Colorado Springs, Colo., was piloted by J. Piele of Pueblo. The flight created a demand for air mail service in both cities.

AS a step toward relieving the shortage of skilled airplane craftsmen, and to spread aviation education, the Alexander Eaglerock factory at Colorado Springs will lend a hand to Centennial High School at Pueblo in offering an aviation course this fall.

Pueblo students will be taken through the Eaglerock plant to study the application of aerodynamic principles. The Alexander company has been asked to furnish several lectures.

Arthur K. Hammond, former commander of flight B, 120th observation squadron at Pueblo, will teach a ground school course and the repair, conditioning and care of airplane motors, air- and water-cooled. The Pueblo high school is the third in the United States to recognize aviation as a course of study.

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America's
Commercial Aviation
Engine
BOOTH 173-174 AERO SHOW
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WE HAVE unusual facilities for teaching all angles of this fascinating business. Competent, conservative instructors licensed by the U. S. Dept. of Commerce; new, licensed Waco planes; finest equipped privately owned airport on the coast; a tuition plan that enables you to *pay while learning.* We are distributors in this territory for Fairchild cabin monoplanes and Waco sportplanes. Send for full details.
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MAHONEY-RYAN *LEADERSHIP!*

1st **Cabin Plane Across the Atlantic!**

1st **Cabin Plane over Pike's Peak with Passengers!**

1st **Cabin Plane to reach Altitude of 24,100 Feet!**

1st **In Performance...*slowest landing* and *fastest take-off* of all cabin planes at the National Reliability Tour, by Official test!**

1st **In Production and Sales among Whirlwind cabin plane manufacturers!**

Efficient engineering and production methods enable us to include finest appointments and equipment with the Ryan Brougham's remarkable everyday performance, at $12,200 Factory.

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The Ryan Brougham is Approved Type No. 25.

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San Diego, California *St. Louis, Missouri*

AM11

WASHINGTON AIR NEWS

By C. M. Litteljohn

DEDICATION of the new airport at Anacortes was held during September. Ten thousand people crowded upon the field to hear the addresses of the mayor, W. D. McCracken, president of the Chamber of Commerce, and other local celebrities, despite the dense fog which curtailed the aerial activities.

PROMISING to establish a flying school and install hangars at Eugene, Ore., the Hobi Airways Co., of Aberdeen, has been given an exclusive franchise to operate a municipal airport at Eugene for three years.

ROBERT J. HENRY has announced a new airplane factory covering 25 acres on E. Marginal Way, Seattle, that will absorb the plant of the Olympic Motor Boat Company.

OPENING day of the new flying field at Mt. Vernon was held early in September. Earl Storrs of Mt. Vernon and L. F. Barnett of Burlington are conducting this new flying field, located on the Ed Knutzen place.

COÖRDINATION of airport development throughout the state of Washington is receiving the attention of a special committee of the state Chamber of Commerce, under the chairmanship of L. Bruning of Colfax. A special committee has been appointed to lend assistance to communities so that the right type of airport may be constructed.

THE Phillips Flying Service has been incorporated at Seattle. Incorporators are John Ambler and Z. S. Maxwell.

CENTRALIA has acquired land for an airport of more than 48 acres which will be graded immediately.

BACH airplanes, of 35-passenger carrying capacity, are to be placed on the airline from Seattle to San Diego by November, it was recently announced by C. D. Phillips, the district representative of the West Coast Air Transport, which is a subsidiary of the Union Air Lines, Inc., of California.

CONSTRUCTION of a 10,000,000-candle-power beacon on the city water tower of Beacon Hill, Seattle, has been started. This air beacon of the Standard Oil Co. will be 105 feet above the street, will revolve and flash six times per minute and will turn on at night and off at daybreak automatically.

A NEW hangar, about 260 feet by 160 feet, is to be constructed at the Naval Air Station at Sand Point, Seattle.

INSTALLATION of a large searchlight and radio beacon system is being urged for Boeing Field, Seattle, by the new manager, J. V. Hyde.

ILLUMINATION from Seattle to Los Angeles is expected by this winter. Surveys of this air route of the Pacific Coast have been made and selections made for lights at the following locations: Tacoma, Camp Lewis, Union Mills, Olympia, Tenino, Centralia, Chehalis, Eveline, Vader, Castlerock, Kelso, Washington; and the following Oregonian points: Scapoose, St. Helens, Goble and the Portland airport.

SPOKANE AIR NEWS

ALL aviation companies at Felts Field, Spokane's airport, and the 41st division air service unit, Washington National Guard, are to be provided with the latest news of weather conditions each day by the United States weather bureau, E. M. Keyser, in charge of the Spokane weather office, announced recently. The information for the pilots is available every morning after 6 o'clock.

CONSTRUCTION work on the second row of commercial hangars for the Mamer Flying Service was started recently at Felts Field, and they will be ready for service shortly.

MILDRED LEE chapter, United Daughters of the Confederacy, will erect a drinking fountain at Felts Field, Spokane's airport, in memory of the late Major A. Fancher. The fountain will be unveiled with ceremonies on Armistice Day, November 11.

ON Sundays Felts Field is under the military supervision of an officer of the day from the 41st division air service unit, Washington National Guard, as an assurance against accidents caused by people crowding onto the field.



SAFETY BELTS

French Safety Belts are made of the finest quality linen obtainable. The clasp is of the service type — safe, dependable, yet easily operated. The price, only $4.00.

CRAWFORD AIRPLANE SUPPLY CO.
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Venice, Calif.

Say you saw it in AERO DIGEST

MILLER AIRPLANE PRODUCTS AGAIN LEAD

TEX RANKIN, head of the famous Rankin Flying School, Portland, Oregon, flew his Waco Ten and black cat to fifth place in the transcontinental race. His was the shortest elapsed time for OX5 motored planes.

Although ships preceding him were powered with 110 H.P. motors, yet Tex gave them a real run for their money in a 3,000 mile race.

Reliability of the motor is as important as speed. We are proud of the fact that the Miller overhead was on Rankin's OX motor in this terrific drive and that it brought him through 100% free from all overhead troubles. Just ask Tex what he thinks of the Miller overhead.

Interesting also is the fact that two thirds of the OX motored planes in this race used Miller airplane products. Write any one of our factory representatives or to us direct for details concerning our products and the many OX5 necessities we stock. A Millerized OX5 represents the last word in reliability, power and economy.

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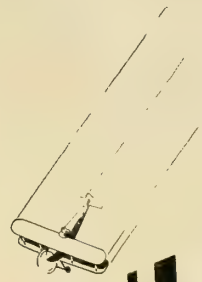
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NEWS OF THE AIR SERVICES

SUMMER TRAINING FOR THE RESERVES AT MITCHEL FIELD

By C. B. Allen

APPROXIMATELY one hundred Air Corps Reserve officers of widely assorted height, weight, rank and previous condition of aptitude were ordered to Mitchel Field this summer for two weeks active duty. The first of them came away cursing; but it was only the Weather Man, not the Army, as of yore. Even the early "classes", as the Reserve camps are called, disgruntled by long days of rain and little time fit for flying, had a good word for the new regime in Reserve training.

To those who had not had an opportunity to attend camp during the last two years, the change was most striking. The ones who were at Mitchel in 1927 said conditions were nearly as good then and that they really got off to a good start in the right direction in 1926. The general impression seemed to be that "Colonel Benny" Foulois (now Brigadier General and Assistant Chief of Air Corps) and his pet theory that an army will do more work in half a day, if it gets every afternoon off, than it previously did in a whole day's "work", were chiefly responsible for the improved aspect of Army life. Wherever the credit belongs it was generally conceded that Air Corps Reserves at last were being handled with more than a glimmer of intelligence, and the rejoicing was great. Present indications are that even more common sense is about to be applied to the problem of keeping former flying officers in a state of effectiveness which would make them immediately useful in the event of war. This will just about round out the miracle.

The summer camp curriculum that obtained at Mitchel Field prior to the advent of Colonel Foulois was a thorn in the side of nearly every Reserve officer who went there for training. It bristled with "lectures" and it was strung out to cover the entire day. Usually the classes were held in the afternoon, whatever flying the "higher-ups" who framed the courses grudgingly conceded having been allocated to early morning hours. It improved matters not at all that they had to be held in sun-baked barracks where the only breath of air stirring was set in motion by the droning conversation of a bored "Regular" officer assigned as instructor and the yawns and snores of the Reserves who were forced to listen to him. If the subjects discussed had been new or interesting, things wouldn't have been so bad, but the prescribed courses, almost without exception, had been lifted from the Ground School schedules of 1918. As most of the Reserves out for summer training had been through the mill that turned out "intrepid aviators" during the late lamented war, this rehash of relevant and irrelevant learning was, to say the least, not very exciting. And when the same dish was handed out with military regularity and sameness at each succeeding summer camp the want of variation became distinctly tiresome. It is mute evidence of the hold that flying gets upon some men that many Reserve officers stoically endured this drivel over and over again for the sake of a few hours in the air.

"What was the use of it, anyway?" asked a Regular who thought as little of the system as the Reserves and was as powerless to change it. "They seemed to have the idea that they could cram an education into a man in fifteen days' training and it just can't be done."

"Won't they ever get wise," said a Reserve, "that we come down here because we want to fly and that our only value to the Government, if we have any value, when an emergency comes along, will be our ability to handle airplanes?"

Apparently something of the truth of this has at last dawned upon someone in authority, or been thrust down their throats by someone else who saw the light a long time ago. This summer at Mitchel Field flying was held paramount to everything else. The fingers of one hand suffice to enumerate the "lectures" that Reserve officers were called on to attend and these had to do with practical and interesting topics; i. e., the theory and art of parachute jumping, how to operate the latest type mapping camera, and what to expect from the D-12 motor which most Reserve officers were getting a chance to fly for the first time. And these classroom periods, virtually without exception, were sandwiched into the main schedule at times when, because of inclement weather or for other reasons, flying was temporarily at a standstill.

What has been said should not lead anyone to conclude that the method of handling Reserves at Mitchel Field has by any means achieved perfection. The system is headed along the right track and is such an improvement over the old method as to seem almost perfect but it is still possible to find a few flaws. Most outstanding among these is the lack of equipment. This has been a serious handicap to Reserve training ever since the condemnation and destruction of the "Jennies" a year ago but is a situation that gradually is remedying itself. Just how serious it was at Mitchel is apparent in the fact that only six of the new-style P-T training planes were available there this summer for Reserve officer classes, some of which had thirty or more members, and that one of these planes was borrowed from the First Corps Area at Boston. Half of these planes were allotted to the First Observation and half to the Fifth Observation Squadron, these outfits in turn drawing an equal number of officers from each incoming class of Reserves.

In all there have been five two-week classes of Reserves at Mitchel this summer totalling about a hundred officers, as has been mentioned before. Actually, only four of these classes were in the current fiscal year, the first having been charged up to the year ending in June. As a result some of those officers who attended the latter camp "doubled up" by returning for a later two-week period of training within the same calendar but a new fiscal year.

At first glance this seems to savor either of favoritism or selfishness, or both, but, on closer examination, it is found to have a sounder basis, the foundation of the Air Corps' new policy regarding the Reserves. The men who were allowed to repeat (after it had been ascertained that no one else qualified to fly would be denied summer training as a result) were those who had established their ability and willingness to pilot an airplane during the June class. They wanted to fly, not only in P-Ts but in the standard service type planes which are now available to Reserve officers, *even on inactive duty*, who have demonstrated

(Continued on next page)



Air Corps Reserve officers at Mitchel Field. C. B. Allen, 4th from left, top row.



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(Continued from preceding page)

their ability to handle these machines. Hereafter, if the attitude of the War Department and the Air Corps is accurately interpreted by Major W. O. Ryan, Acting Air Officer of the Second Corps Area, it will be the policy of the Government to encourage in every way possible "civilian Air Corps officers" who can qualify as fliers and are willing to "keep their hands in" not only by attending summer camps but by going down to Mitchel as regularly and frequently as possible for "practice flights".

This means the eventual elimination from summer training camps, and from the Reserves as well, of men who cannot qualify as fliers and of men who will not fly when they have the opportunity. If this policy is carried out it will result in a vast cutting down of the Air Corps Reserve, or at least in a wholesale reclassification of the officers now in it, so that the "dead wood" will no longer cramp the style of those who are able and eager to fly.

There was much of this so-called "dead wood" in evidence at Mitchel Field this summer as there has been at all camps for Reserve training since the scheme was instituted after the war. Some of it is inevitable for men develop unsuspected defects from one year to the next that in the opinion of the flight surgeon make it unsafe for them to fly. Others manage to get "waivers" on slight shortcomings of sight, hearing, etc., but it usually takes several days for these to come through from Washington and this time is just so much time lost. Still others come to camp knowing that they will be unable to qualify, yet taking a "tour" of duty and using up funds that otherwise might go to the training of an active Reserve flier. At least one officer who attended camp at Mitchel Field this summer tried for weeks prior to the encampment to get a ruling from "higher up" that would bar him from thus encumbering the Reserve training machinery because he had established his inability to pass the required physical examinations, but he could get no action. Finally, a few days before the two-week period was over, he and one or two others who were in the same category were ordered "demobilized" without having once been in the air except as unauthorized "passengers" who could not even draw flying pay. On the other hand the matter of physical disqualification often seems to be carried to unnecessary and foolish extremes, the most glaring example at Mitchel Field being that of the late Harry Chandler, veteran air mail pilot, who took a bus driver's holiday by asking for two weeks' active duty in the Reserve and was barred from flying for physical disabilities until some special pressure was brought to bear during the last day or two of the camp. Once "Washington" had relented, he was allowed to fly anything and everything on the field.

The new policy of the Air Corps was apparent this summer in the celerity with which Reserve officers were "checked out" on P-Ts and "checked in" on the Curtiss Falcon observation planes which are standard equipment for the regular officers at Mitchel Field. As soon as a man could demonstrate to the satisfaction of the squadron commander or one of his designated "check pilots" that he was able to fly either a training or service type ship, he was "soloed" and soon thereafter given regular "missions". In fact, a "war" or two in which Mitchel Field planes had to participate to "save" New York did a lot to swell the total flying time of many Reserve officers who otherwise would have finished their two-week tours with a much more paltry number of hours in the air than they actually piled up. And this may be an opportune moment to remark that lack of machines, bad weather and other causes resulted in Reserves getting an average of between ten and fifteen hours during two weeks' active duty whereas the ideal amount would be twice or thrice this figure. But this is largely a matter of more equipment and more equipment is always promised "next year". It may be said that one other drawback in the present Reserve system which already has been pointed out—the number of officers unable to qualify for flying—served as something of a blessing in this particular instance, the shortage of equipment not being nearly as apparent as it would have been had all those who reported for flying duty been able to fly.

SECOND BOMBARDMENT GROUP AT THE NATIONAL AIR RACES

FROM the historical point of view, one of the most important outfits at the National Air Races in Los Angeles was the Second Bombardment Group, Army Air Corps. This group was formed at Kelly Field, San Antonio, a few months after America's entry into the great war. In France the outfit was equipped with dilapidated French ships, but in spite of its handicaps in equipment, the Second Bombardment Group established an enviable record by its daring bombing expeditions over enemy lines. During the two months in which it engaged in active service, the group dropped 500,000 pounds of bombs in German territory and brought down forty-nine enemy planes. The Distinguished Service Cross was awarded to twenty-five members of the organization.

Since the war the Second Bombardment Group has continued to be an important factor in the Army Air Corps, having participated in practice bombardments of battleships (in which it has sunk five), in the demolition of the Swift Island Bridge, and in maneuvers in transferring its entire personnel and equipment from one field to another.

Nine LB-5A bombardment airplanes of this organization made the flight from Langley Field, Virginia to Los Angeles to take part in the air races last month. By making the coast to coast trip as a unit, the officers of the group were able to obtain data on actual "flying time" required by an outfit of this size over long distances. The personnel of the flight consisted of fifteen officers, fourteen enlisted men, one representative of the Keystone Aircraft Corp., and one representative of the National Advisory Committee for Aeronautics. Major Hugh J. Knerr commanded the flight to Los Angeles.

The LB-5A type airplane (the Keystone "Pirate") flown by the group is the latest development in bombardment aircraft. It weighs, fully loaded, 12,155 pounds. In military operation its bombs, 5 machine guns, radio equipment, fuel and crew personnel of five weigh 5,131 pounds. The bomber may remain in the air 5 hours with this weight aboard and operate effectively from a ten thousand foot altitude. Its speed ranges from 85 miles per hour when cruising to 110 miles per hour at full throttle. Its rate of climb at sea level is 600 feet per minute, fully loaded. The radio equipment carried permits the airplane's crew to remain in constant communication with crews of other airplanes of this type within a radius of 100 miles. The cruising radius is from 400 to 600 miles, depending on the weight of bombs carried.



Second Bombardment Group who participated in the National Air Races.

Standing from left to right: 1st Lieut. David L. Behncke, Capt. Ira F. Peake, Flight Surgeon, 2nd Lieut. William B. Blaufuss, Maj. Hugh J. Knerr, Commanding Officer, 1st Lieut. Emile T. Kennedy, 2nd Lieut. Alfred H. Johnson, 2nd Lieut. A. J. Kervin Malone. Kneeling: 1st Lieut. Harold W. Beaton, Capt. Cecil G. Sellers, 1st Lieut. Phillips Melville, 2nd Lieut. Ford L. Fair, 1st Lieut. Wilton Briney, 2nd Lieut. Willard R. Wolfinbarger.

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THE AERONAUTICAL INDUSTRY

ENGINEERING AERODYNAMICS

By Lieutenant Walter S. Diehl, U. S. N.

A MOST important volume of the Ronald Aeronautic Library is the newly published "Engineering Aerodynamics." This volume brings to the aeronautical engineer and student a large quantity of theoretical and practical design data, digested and arranged in form for convenient reference and use. It shows how the modern theories of lift and drag are applied to everyday aircraft design problems; gives methods for designing control surfaces; explains advantages and limitations of airplane model tests and shows how data are interpreted. It gives detailed methods for calculating and estimating performance, explains how performance tests are made and how the observed data are reduced to standard conditions. Design and test data on seaplane floats and hulls are given, and the way test data are used in performance calculations shown.

This new book supplies the aeronautical engineer with a carefully selected theoretical treatment limited to subjects required for the understanding of modern hydrodynamic theory and its practical applications. The more important hydrodynamic terms are briefly explained, including stream function, velocity potential, circulation, vortex theory, etc. How the induction theory is applied to design is shown. Numerous working equations of motion are developed for all of the more common problems of rectilinear and curved flight.

Test data are given for a number of standard wing sections, supplemented by descriptions of the various methods which may be employed to select a section for a particular purpose. Test data on flaps and ailerons are presented in new and convenient forms. The chapter on Parasite Drag includes selected data on struts, wires, fuselages, floats, streamline bodies, etc. Methods of conducting and interpreting wind tunnel tests are explained.

Lieutenant Diehl's book shows how to interpret model test data; gives a method for designing control surfaces; how to calculate performance, including methods for rapid performance estimation. Design information on seaplane floats and hulls is given and the way in which model basin test data are used in calculating water performance is described.

Much of the data is entirely new; in fact, about two-thirds of the material in the book has never before been available. Particular effort has been made to present all data in forms that have been found suitable for practical application.

THE BIBLIOGRAPHY OF AERONAUTICS, 1925

THIS work, published by the National Advisory Committee for Aeronautics, covers the literature published from January 1 to December 31, 1925, and continues the work of the Smithsonian Institution issued as volume 55 of the Smithsonian Miscellaneous Collections, which covered the material published prior to June 30, 1909, and the work of the National Advisory Committee for Aeronautics as published in the Bibliography of Aeronautics for the years 1909 to 1916, 1917 to 1919, 1920 to 1921, 1922, 1923, and 1924.

As in the previous volumes, citations of the publications of all nations have been included in the languages in which these publications originally appeared. The arrangement is in dictionary form with author and subject entry and one alphabetical arrangement. Detail in the matter of subject reference has been omitted on account of the cost of presentation, but an attempt has been made to give sufficient cross references to facilitate research in special lines.

The Bibliography of Aeronautics for 1925 contains 189 pages, and may be obtained direct from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 50c per copy.

THE A B C OF FLIGHT

W. LAURENCE LePAGE has written an excellent book for those who wish to develop interest in and knowledge of the theory and practice of flying.

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The chapter on flying clearly outlines and explains the process of learning to fly. The final chapter is a discussion of the types and operation of aircraft engines.

The need for just such a book explaining the "whys" and "wherefores" of flight to the layman has long been felt and we can highly recommend the "A B C of Flight" as fulfilling this rôle.

Mr. LePage has had wide practical experience in the aeronautical field and at the present time is associated with one of the well known airplane manufacturers and operators—Pitcairn Aviation, Inc.

NEW AIRLINE ROUTES and SCHEDULES

THE following new airline schedules and changes in schedules have been established since the September issue. A complete list of mail, passenger and express airlines was printed in the December issue. New lines opened since that date or new schedules have been added in each succeeding issue.

Air Mail, Passengers

MIAMI, KEY WEST, FLORIDA; HAVANA, CUBA (Provisional service effective from September 15 to December 15, 1928.) Operated by Pan American Airways, Inc.

Time Table

Southbound (Read down)			*Northbound (Read up)*	
8:30 a.m.	Lv.	Miami		
10:00 a.m.	Ar.	Key West		
10:15 a.m.	Lv.	Key West	Ar.	5:15 p.m.
11:45 a.m.	Ar.	Havana	Lv.	4:00 p.m.

Passenger Rates

Miami-Havana, $75 (one way).
Key West—Havana, $50 (one way).
Key West—Havana, $75 (round trip).
(Effective only until December 1, 1928.)

Reservations and Information

New York City—Pershing Square Building, 100 East 42nd St. (Tel. Caledonia 2363).
Miami, Fla. 44 Biscayne Blvd. (Tel. 4188).
Key West, Fla.—La Concha Hotel Bldg. (Tel. 377)
Havana, Cuba Sevilla-Biltmore Arcade (Tel. A-2222)
Hartford, Conn.—F. I. Davis, 102 Pearl Street.
Thomas Cook & Company—Any office.

Air-Rail Service, Passengers

NEW YORK, N. Y.; CHICAGO, ILL.; ST. PAUL, MINNEAPOLIS, MINN. (Opened September 1, 1928) Operated by Northwest Airways, Inc.; Transcontinental Air Transport, Inc.; Pennsylvania; Great Northern; Northern Pacific; and Chicago, Milwaukee, St. Paul and Pacific Railways.

Time Table

Westbound (Read down)			*Eastbound (Read up)*	
(E. T.)	**(Rail)**			
6:15 p.m.	Lv.	New York, (Penna. Sta.)	Ar.	9:40 a.m.
6:10 p.m.	Lv.	New York (Hudson Term.)	Ar.	9:41 a.m.
(C. T.)				**(E. T.)**
2:05 p.m.	Ar.	Chicago (Union Sta.)	Lv.	12:40 p.m.
	(Air)		**(Rail)**	
3:00 p.m.	Lv.	Chicago (Cicero Field)	Ar.	12:10 p.m.
7:00 p.m.	Ar.	St. Paul (Mun. Airport)	Lv.	8:40 a.m.
7:10 p.m.	Ar.	Minneapolis (Wold-Chamberlain Field)	Lv.	8:30 a.m.
	(Rail)		**(Air)**	**(C. T.)**
9:45 p.m.	Lv.	St. Paul via Grt. Northern R. R.	Ar.	7:45 a.m.
10:25 p.m.	Lv.	Minneapolis, Grt. Northern R. R.	Ar.	7:12 a.m.
11:25 p.m.	Lv.	Minneapolis, C., M., St. P. & P. R. R.	Ar.	7:50 a.m.
11:05 p.m.	Lv.	St. Paul via North Pac. R. R.	Ar.	7:35 a.m.
11:45 p.m.	Lv.	Minneapolis, North Pac. R. R.	Ar.	7:05 a.m.
			(Rail)	

*Transfer to airplane at Minneapolis.

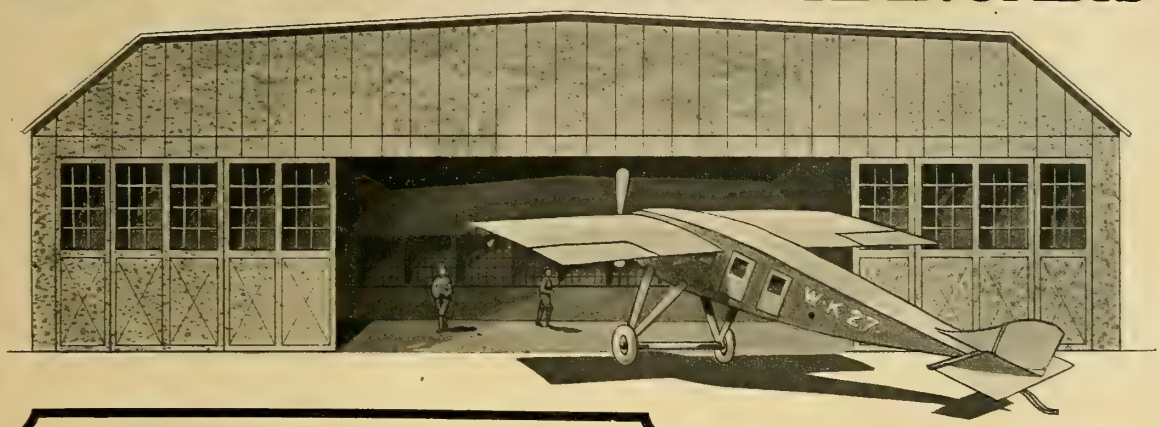
Passenger Rates

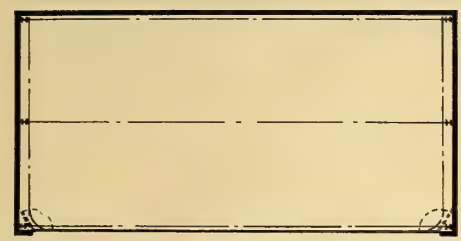
Chicago—St. Paul and Minneapolis via airplane, $45 (including transfer between fields and railway stations).

Reservations and Information

St. Paul, Minn.—Executive offices, 501 Merchant's Bank Bldg. (Phone Cedar 5693).
Minneapolis, Minn.—Wold-Chamberlain Field (Dupont 4881).
Chicago, Ill.—Cicero Field (Hemlock 0017).

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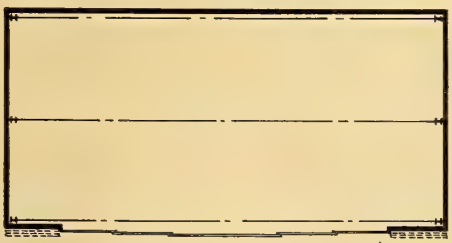




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1ST NATIONAL AERON. SAFETY CONFERENCE

A CONGRESS on safety in commercial aviation will be held in New York City on October 4th and 5th under joint auspices of the Daniel Guggenheim Fund for the Promotion of Aeronautics and the National Safety Council. The sessions will be held at the Pennsylvania Hotel.

This will be the first national conference on the problem of safety in aeronautics and is of singular importance, because public acceptance of the airplane as a commercial carrier depends largely upon the question of safety. The program of the conference will include discussions on such problems as aeronautical legislation, aircraft design, construction and equipment, landing fields, and special aids to aerial navigation.

The principal speakers at the conference will be: Ted Wright, chief engineer, Curtiss Aeroplane and Motor Co.; Edward P. Howard, assistant chief, Air Regulations Division, Department of Commerce; Wesley L. Smith, superintendent of eastern division, National Air Transport, Inc.; H. H. Blee, Aeronautics Division, Department of Commerce; Col. Paul Henderson, vice president, National Air Transport, Inc.; Dr. C. G. Rossby of the Daniel Guggenheim Fund; Dr. W. R. Gregg, assistant chief, U. S. Weather Bureau; Sherman M. Fairchild, president, Fairchild Airplane Mfg. Corp.; William B. Stout, president, Stout Metal Airplane Co.; George Mead, chief engineer for Pratt and Whitney Aircraft Co.; Dr. Otto Mader of Dessau, Germany; Capt. Oliver P. Echols, U. S. Army Air Corps; M. Sabatier of Paris, France; Major John Berry, manager, Cleveland Airport; C. F. Hingsburg, chief of Airways Division, Department of Commerce; Dr. J. H. Dellinger, senior physicist of Bureau of Standards, Department of Commerce; Dr. L. H. Bauer, medical director, Air Regulations Division, Department of Commerce; Prof. Alexander Klemin, Guggenheim School of Aeronautics of New York University; Thomas Carroll, chief test pilot, National Advisory Committee for Aeronautics; Harold Pitcairn, president, Pitcairn Aviation, Inc.; Woody Hockaday, Aeronautics Division, Department of Commerce; Major L. F. Richard of London, England; J. C. Hunsaker, Bell Telephone Laboratories; Lt. A. F. Hegenberger, U. S. Army Air Corps; Lt. Commander C. E. Rosendahl, Commander, *U. S. S. Los Angeles;* Hon. E. P. Warner, Asst. Secretary of the Navy for Aeronautics; Sgr. Molfese, director of civil aviation in Italy; Dr. H. C. Dickinson, Bureau of Standards, Department of Commerce; Charles L. Lawrance, president, Wright Aeronautical Corp.; Major C. C. Moseley, vice president, Western Air Express; Colonel Charles A. Lindbergh; Commander E. E. Wilson, U. S. N., chief of staff, Aircraft Squadrons; Major R. W. Mayo, British representative of Guggenheim Fund; Major E. L. Hoffman, U. S. Army Air Corps; Dr. J. S. Ames, Chairman, National Advisory Committee for Aeronautics; Hon. W. P. MacCracken, Jr., Asst. Secretary of Commerce for Aeronautics, Department of Commerce; and Hon. T. L. Raymond, mayor of Newark, New Jersey.

NORFOLK MODEL MEET

DURING the Regatta and Carnival at Norfolk, Virginia, two airplane model contests were among the principal events. Fourteen young men under 21 years of age competed for a large silver trophy offered by AERO DIGEST. Upon the invitation of Mr. Frank Winch, secretary of the Norfolk Regatta Carnival Association, Lieut. Alford Williams, prominent U. S. Navy flier, and George F. McLaughlin of AERO DIGEST acted as judges and timers of the indoor and outdoor contests held at Hampton Roads, near Norfolk, on September 14th. Lieut. Williams flew to Hampton Roads from Washington especially for the model contests; incidentally, he gave an exhibition of stunt flying in his Curtiss Hawk.

Commander Albert C. Read permitted the use of the large airship hangar for the indoor model contest. A few minutes after his stunt flight Lieut. Williams appeared at the hangar eager to witness the model contest. His interest and enthusiasm at the fine flights the boys made with their models was a source of great encouragement to the model builders. The contest was won by Smith McKann whose model remained in the air for 2 minutes, 44 seconds. Second in the contest was Albert B. Schwarzkopf, Jr.; time, 2 minutes, 16 seconds.

In the outdoor contest Schwarzkopf made a record of 2 minutes, 14 seconds. McKann's model made a flight of 1 minute and 50 seconds.

Master Schwarzkopf, although only 13 years of age, was in entire charge of all model arrangements for the Regatta Committee, a duty which he performed with marked success.

Entrants in the contest were as follows: H. Page Hoggard, Jr.; Smith McKann; James Groves, Jr.; Albert B. Schwarzkopf; Edward Harrell; Everett Land, Jr.; Morton Riddle; William Bain; Milton B. Ames, Jr.; William Ames; all of Norfolk. John S. Barleon, of Portsmouth, James Daughtery, Melvin Williams and E. Allen Brown of Richmond, Virginia.



Albert B. Schwarzkopf, Jr., winner of outdoor model contest at Norfolk, Va.

AIRPLANE MODEL CHAMPIONS RETURN

DOWN the gangplank of the *S. S. George Washington,* on August 17, came two grinning, travelworn young fellows who looked less like conquerors of Europe than like youngsters who thought Hoboken a pretty decent place.

They had made a triumphal swing around Europe, all the same, these two tourists. They had dined with the British air minister, had competed at Croydon Field, had signed their names in the famous Golden Book in Paris.

One of the two was Aram Abgarian, 15 years old, Detroit, holder of the world's record for indoor model airplanes and national indoor champion. The other was Thomas C. Hill, 16, Winston-Salem, N. C., boys' outdoor champion. They had been sent to Europe by *The American Boy* magazine because of the showing they made at the First National Contest of the Airplane Model League of America, held by the magazine June 28-30 at Detroit.

There were three other members in the party: Merrill Hamburg, secretary of the A. M. L. A., who acted as official conductor, Ford Grant, 19, Michigan outdoor champion, and Jack Loughner, 17, former national outdoor champion.

They sailed on July 6 from Montreal. After landing in England, their first task was to get ready the outdoor planes they had built on board ship for the contest that had been arranged for them at Croydon Field by S. H. F. Crouch, secretary of the Society of Model Aeronautical Engineers.

Because the contest was held on such a windy day, they "cracked-up" every available plane they had, trying to get them aloft in the capricious air, before Ford Grant managed to send up his last plane for a flight of better than two minutes. That flight gained him the first international championship for "flying stick" models. W. J. Plater, of Great Britain, won the event for the fuselage type of models.

Lady Heath, Great Britain's famous airwoman who flew alone from Capetown, South Africa, to London, presented the prizes given by the Canadian Pacific Railroad, and then invited all the members of the American party to ride with her in her Moth plane.

In Paris, Sidney B. Veit, president of the Paris chapter of the National Aeronautic Association, took the party on a tour which included aircraft factories, landing fields, and a number of historic spots. They were given a signal honor in Paris, for they signed their names in the Golden Book, under the signatures of Orville Wright, of Byrd, of Lindbergh, of Chamberlin, of Costes and of LeBrix. Every other name in the book is that of a famous aviator. In four days of sightseeing, they saw the Louvre, the great parks, and the battlefields a few miles away.

Then to Geneva, where officials of the World Y. M. C. A. and of the League of Nations took them in charge. And after that came Switzerland and the Alps, Venice, Florence, and Rome.

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Choose the position you want—pilot, mechanic, designer, aircraft business man, field superintendent, airport manager, aircraft manufacturer—countless big positions are open for the trained man in every line of aviation. Take the training that will equip you for any one of those positions—get the newest features of aeronautical training at the College of the Air. The "jack of all trades" has no place in aviation—masters are wanted. You need a specialized training. Marshall Flying School has new courses, new equipment and new methods of instruction to give you the help you need; all courses are offered now.

It's Easy to Start With Straight Flying Course at $75. For the low cost of $75 you can enter aviation and take all the fundamentals. This course, teaching you regular flying, will be a stepping stone for you—a means of entrance in the greatest of careers.

This Straight Flying Course is but one of the many new courses which the College of the Air has introduced after four years of experience is giving aeronautical training to young men.

Mail the coupon below and get the free catalog which explains and describes the new courses and tells you how you can find your way into this promising industry.



This student obtained a good position with an airplane company after graduating from Marshall Flying School. Superior training helps the student into such positions.



After taking the training at Marshall Flying School, this graduate is thoroughly trained for this important manufacturing work in an airplane plant.

Straight Flying Course—Regular flying instruction including the fundamentals and requisites of ordinary flying. Price (without ground course) ---------- $75.00

Primary Flying Course—Work in Straight Flying Course and advances students to crosswind landings and take-offs and difficulties encountered in flying in all sorts of conditions. Price, including Mechanic's and Engineer's Ground Course ---------- $150.00

Intermediate Flying Course—Instruction given in both Straight Flying and Primary Flying Courses and advances student through full 10 hours of work in the air. Student can be soloed if ability is shown. Price, including Mechanic's and Engineer's Ground Course ---------- $200.00

Complete Aviation Course—All principles of flying and every needed requisite to make you a successful flyer. Forced landings, cross country and all-weather flying. Solo flying guaranteed. No bond required. Price, including Mechanic's and Engineer's Ground Course ---------- $245.00

Private Pilot's License Course—Flying time and training for a private pilot's license. Training qualifies you for eligibility for license. Ten hours of solo flight. Arrange your examination at field. No bond required. Price, after solo ---- $150.00

Limited Commercial Course—Special advance course. Qualifies you under the Department of Commerce for the Government Limited Commercial Pilot's License. Get the Primary Flying Course and 50-Hour Advance Course. Price, including Mechanic's and Engineer's Ground Course ---------- $700.00

Mechanic's and Engineer's Ground Course—Especially to prepare for mechanics, ground and factory work. Also beneficial to contemplated flyers. Course includes metal airplane construction, repair and maintenance; motor assembly and overhaul; steel fuselage construction and repair; aerial mapping, meteorology, navigation, instrument reading, and theory of flight. Undoubtedly the finest ground course in the country. Plenty of equipment. 300 hours training. Price $75.00

This course is given free with all our flying courses with exception of the Straight Flying Course.



One class of the Marshall fall term students who are taking aviation training under the new methods.

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NEW ENGLAND NEWS

By George W. Hamblin

ANDREW J. IVANOFF, treasurer of Skyways, Inc., took delivery of his new Whirlwind Stearman during the month, and the ship created quite an uproar at the Boston airport with its more than complete instrument board. There is everything on the airplane but running hot and cold water and a cocktail shaker.

Ted Kenyon, president of Skyways, Inc., and Mrs. Kenyon flew a Warner-engined Challenger to fourth place in the Class A Transcontinental Race. Ted did a remarkable job, and we're all darned proud of him.

The Wareham field, down on the Cape, has been closed for the season, with the exception of week-end flying by Charlie Emerson. Charlie was down there all summer, with George Barry, Danny Dugan and Tom Goldie helping out.

Student business with Skyways is reported as being good, with fair cross-country business and good joy hop work, according to Bob Townsend. Pilots included Crocker Snow, Ted Kenyon, Olcott Payson, Charlie Emerson, and a new one, Lieut. Jack Langley, Army reserve. By the way, Payson made what appears to be record time for the distance between Boston and Portland, negotiating the distance of ninety-odd miles in forty-seven minutes, in the Whirlwind Stearman.

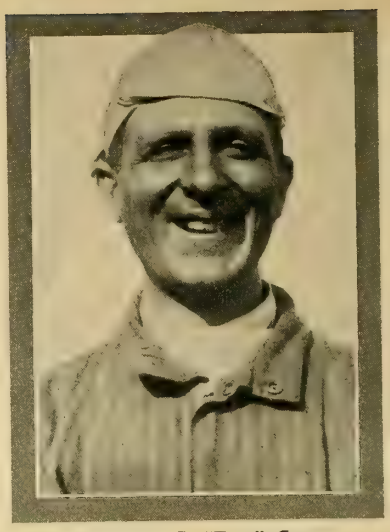
WITH the thought that the cross-country business is the big thing that will come in commercial aviation, the Boston Airport Corp., with the most complete equipment of any company operating near Boston, has branched out with a bunch of hours flown every week to points out of town. Frank D. LeMan, traffic manager, is digging every minute for long hops, and has succeeded in keeping the ships of the Corp. on the go practically all of the time. General Manager B. F. Billings flew a new cabin Loening "Duck" up from the factory, and the Hornet-engined job has known little peace since it arrived.

In addition to the "Duck", the corporation has a Fairchild seaplane, two Stinson-Detroiters, two Whirlwind Travel Airs, and two Travel Airs for student work.

THE Dennison Airport Corp. celebrated its first anniversary by putting in operation the first of two 2,200-foot runways. When the second runway is finished, the field will be equipped for night flying, and will assume the aspects of one of the best fields in this section.

THE Hyannis Airport, operated by Robertson "Bob" Ayling, was officially opened September 7, 8 and 9 with an air meet that was a "wow". About thirty ships attended, and Bob treated everybody so well that the whole gang swore that they would go back to Hyannis next year or break a leg in the attempt.

The meet was marked by OX races, Whirlwind commercial races, pursuit ship race and stunt flying, bomb dropping, "On-to-Hyannis" race, and the usual passenger carrying. Captain Albert L. Edson, of the



Thomas C. "Tom" Croce.

Dennison Airport Corp., won both OX races from Tom Croce; Lieut. Crocker Snow won the Whirlwind commercial race in Skyways' Stearman; Lieut. Charles Clark won the military observation type race in the Army Vought from Boston; Tom Croce captured the bomb-dropping; and Lieut. Stanley E. Beck won the "On-to-Hyannis" race.

The Hyannis Airport is completely equipped with night flying equipment, and Saturday night Crocker Snow and Olcott Payson carried passengers in the two Stearmans, one of which is Andy Ivanoff's and the other the property of Skyways.

Sergeant Belcher and Lieut. Brice of the Marine Corps in their Curtiss Hawks gave several beautiful stunt exhibitions.

WITH the delivery of their first Hisso American Eagle, the Amesbury Airways, Inc., branches out in its activities. W. E. Apte, formerly in charge of the Porterfield Flying School at Kansas City, Mo., has been engaged as a pilot to help out Earle F. Crabb, chief pilot for the company.

Amesbury plans to run an air meet October 5, 6, and 7 and officially dedicate its field, according to Harry Finnell, president of the corporation.

LIEUT. ADOLPH M. BACKSTROM, chief pilot for the Bay State Flying Service, hops off from the Boston Airport every Saturday morning and flies up to Portsmouth, N. H., where the company has a new field. "Backs" has eight students up there, and is busy all afternoon Saturdays and Sundays carrying joy hop passengers.

MRS. DOROTHY WARRICK, first woman to go solo at the Boston airport, and her husband, Bill, along with John Ivanoff, Cobham Noyes and Dick Holihan, have organized Skyways, Inc. of Michigan at Bill's home town, Flint. The last word we had was that they were dashing ahead with leaps and bounds, selling Stearmans and Challengers right and left.

HAVING received a new combination Eaglerock, and having sold their long-wing job, Old Colony Airways Corp. down at Muller Field, Revere, is still hanging on. "Bon Bon" DeArce is chief pilot and Mike Harlow is second pilot. DeArce is turning into an air meet fan with the Ryan brougham. Bon Bon went up to Derby, Vt., for the meet that Bill Cleveland held up there September 21st and 22nd, and he is planning to take in every meet that is on the books at the present writing.

The two Eds, Radasch and Fischer, are still their jovial selves, and everything seems to be aces down on Squire Road.

LEO "SKIP" TRACEY has gone up to Springfield, Mass., to fly with the Springfield Airport Corp. at Fisk Park. Leo was formerly flying for Bill Revine down at South Easton, Prior's airport.

GEORGE WATKINS was flying a Fokker Universal up at Sheffield until a tornado came along one night and pulled the tie-down stakes right out of the ground. The ship was carried two hundred feet, over a twenty-foot flagpole and then thrown to the ground.

JACK AYRES, of Northampton, Mass., received his unlimited license from State Inspector of Aviation, Robert L. O'Brien. Ayres is flying a new model Hisso Eaglerock.

Who's Who at the Boston Airport

Thomas C. "Tom" Croce, Gypsy pilot deluxe

LADEES and gent'lmun! May I introduce Tom Croce, one of the last of the barnstormers! This interview is written exclusively for the male readers of Aero Digest, as Tom is married and is the father of eleven children, eight of whom are living. Yes, gentle reader, Tom is the only pilot in the country, and in the world for all we know, who can claim this distinction.

Thomas C. Croce, as he was christened, was born in Naples, Italy, on December 10, 1890. He attended grammar school in Naples, and came to this country when he was fourteen years old. Motorcycling caught his fancy when he was in America a few months and he started right in riding, later joining the ranks of cycle racers.

In 1911 Croce became interested in aviation, and built an automatic balancer for airplanes. In 1923 Tom learned to fly at Curtiss Field, and bought himself a Canuck. With Wilmer Stultz flying, he came to Boston, and then began a round of barnstorming out of everybody's back yard east of Springfield.

Tom is something of an airplane designer, because the plane that he flew here at Boston this year was a marvel. It was a Canuck fuselage with Oriole wings, which gave it the name of "Canoriole." Fliers here said the thing would never fly when he was setting it up last spring, but Tom has put 178 hours in it and never hurt a soul. He now owns a Challenger, and has walked right ahead with his business.

If he ever wants to quit flying, the can go on the stage and kill 'em with his comedy. Don't I Know? Haven't I just spent four days with him on Martha's Vineyard? Dunt esk.

(*Continued on next page*)



Through the rain and hail and snow The Air Mail has got to go.

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For The Silent Courier of The Night

High and steady on his course the mail pilot speeds from New York to Atlanta . . . down the line to Philadelphia and Washington and over the hills of Virginia, the Carolinas to Georgia . . . his companions in flight the Pitcairn Super Mailwing and Naturaline the super aviation fuel.

Far below him, through the night, the old steam mail writhes ponderously amongst the hills, while the Super Mailwing's pilot guides her on over rivers and forests, lakes and mountains, serenely confident in the unfailing performance of his ship, his Wright "Whirlwind" motor and "Naturaline" his fuel.

Naturaline is made entirely from natural gasoline and demonstrates a decided superiority in quick starting, fast pick-up, greater speed—20 to 25 per cent more power.

It has high volatility without gas lock, complete combustion and complete burning even at low temperatures, does not freeze the carburator at high altitudes and WEIGHS 46 POUNDS PER 100 GALLONS LESS THAN DOMESTIC AVIATION FUEL.

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CHESTNUT & SMITH BLDG., TULSA, OKLA.





George H. Corliss and Miss A. Lane Allen before boarding the C. A. T. plane.

(New England News continued)

FROM time to time articles on commercial air transport and air mail, written by George H. Corliss, advertising manager of the S. A. Woods Machine Company, Boston, have appeared in various industrial publications. These articles have been quoted by air mail contractors, by writers in newspapers and magazines, reprinted in many other publications, commented on favorably by men whose names are famous in the field of aviation and published by the United States Department of Commerce in Domestic Air News. The publication of these articles is acknowledged to have had a tremendous effect in focusing public attention on the great growth now taking place in this country in the aviation industry, and the importance to business of commercial air transport and the air mail.

The accompanying photograph of Mr. George H. Corliss and A. Lane Allen, short story writer, was taken just before they boarded the Boston-New York air mail plane for Hartford, Conn.

The new Fairchild Cabin Monoplane just put on the Boston-New York service by Colonial Air Transport, Inc., to carry air mail, express and passengers, was piloted by Captain Mackie.

Brockton Airport, Inc.

BROCKTON AIRPORT, INC., has been formed at Brockton, Mass., to operate a commercial airport and general commercial aviation business. Gordon Varney is president of the company; Richard P. Whitman, treasurer; Harry R. Allen, secretary; R. C. Stroop, chief pilot.

The airport contains 80 acres and is approximately square. It is located on the main highway between Boston and Cape Cod and about 20 miles from the former city. Paved streets are on three sides of the airport, and a street car line is on one side. The east and west runway is hard surfaced for 1,200 feet and has turf approaches of 500 feet on each side. The north and south runway now in use is 700 feet long and clear of obstructions on each end. A hard surfaced runway is under construction. It will be 2,700 feet long when completed and clear of obstructions on each end.

A new Truscon steel hangar, 60 x 72, is now in use and a 30 x 42 building which was standing on the property is being equipped for repairing and rebuilding planes and engines. Gasoline and oil service are available on the field.

In addition to passenger carrying, student instruction, air taxi service, and the operation of the airport, the company also distributes the International airplanes in the states of Massachusetts, Connecticut and Rhode Island.

Rhode Island News

By Thomas F. Bresnahan

TWO companies were added to the Rhode Island aviation services during the past month. Fliers, Inc. of Rhode Island, formed to manufacture and deal in airplanes in West Warwick, was one of the new firms. Homer A. Gelineau, Leo A. St. Onge and Daniel W. Beaton, all of West Warwick, were the incorporators.

The second company will be known as the Little Rhody Flying Service, Inc., and will locate at the Buttonwoods Flying Field for the time being. Later a permanent field will be secured. The incorporators were John Kraw Krawszuk, Leo B. Carty and James O. McManus.

AN Airway sign has been placed on the Oliver Arnold farm, Chopmist Hill, Scituate. This peak is the highest in the state, and the sign is visible a great distance.

NORTH ATTLEBORO high school has become the first New England high school to institute a class in aviation as a regular study. This announcement was made by Edwin Hartwell, sub-master. The school has a plane, located at Martin Field, which was loaned the school by the Navy Department.

MARTIN FIELD, North Attleboro, was dedicated recently during a testimonial event arranged for Congressman Joseph Martin, after whom the field was named. The field is the permanent home of the Curtiss Aviation Service, formerly of Pawtucket.

THE official dedication of the What Cheer Airport, Pawtucket, the home of the What Cheer Airways, Inc., will be held on October 12, 13 and 14 when a military air meet will be staged under the Rhode Island National Guard Officers Association. Captain Charles H. Nolan of Pawtucket will manage the meet.

This field is being improved continually. A six-plane hangar has just been erected and a restaurant installed. Lights will be installed soon for night flying. The company now operates two Wacos. Malcolm Harris is chief pilot and instructor, with Leo J. Leeburn as his assistant.

Connecticut News

By C. Stuart Henderson

AN appropriation of $250,000 for the expansion of Brainard field will probably be placed before the voters at the November elections.

The commission's plan is to purchase 217 acres of land which, added to the present 163 acres of Brainard field, will give Hartford an airport large enough for all time, Secretary James B. Slimmon stated. Options on the new land have been secured, and it is estimated that about $50,000 will be needed to condition the new acreage for airplane service, bringing the total sum to about a quarter of a million dollars. The proposed enlarged field will be roughly 3,500 feet square, making possible runways of 4,500 feet.

THE Tredennick Paint Manufacturing Company of Meriden had the word "Meriden" painted on top of one of its buildings in letters six feet high and five feet wide. The letters can be seen from an altitude of 5,000 feet.

EIGHT more directors have been elected to the Bridgeport Airport, Inc., bringing the total to fifteen. At the annual meeting of the corporation at the end of August, the following men were elected: Walter B. Lasher, DeVer H. Warner, Sumner Simpson, Gilbert W. Goodridge, Samuel P. Senior, Edmund S. Wolfe, S. D. Locke and Julius H. Siebert.

A NEW trimotored Ford monoplane equipped with Pratt & Whitney Wasp engines is at the Pratt & Whitney hangar at Brainard field. The plane is owned by Charles W. Deeds, secretary and treasurer of the company.

THE Aeronautical Products Corporation commenced the manufacture of motors for light airplanes in Naugatuck, Conn., on August 1. Machinery valued at $200,000 has been installed, and the output is planned at twenty-five motors a day, according to the officers of the company, who are H. Alex Johnson of New York, president; Clarence Austin of Naugatuck, secretary, and Harris Whittemore, Jr., treasurer.

GEORGE H. PHELPS, junior pilot and ground instructor of the Interstate Airways, Inc., is now at the head of the Hartford Model Airplane club, succeeding Louis Hatry. He will take charge of instructing members in aeronautics and will inaugurate the program which will dominate the future club activities. Phelps has been a model builder since 1912 and has built man-carrying gliders. Outdoor competition plans for the members are now under way.

THREE new pilots have come to Brainard field recently. Frederick J. Boots, formerly chief pilot of the Massachusetts Airways, Inc., of Springfield, Mass., is now with the L. & H. outfit. Ernest J. Berns, recently of the Meriden Airport Corporation, is now connected with the Interstate Airways. George H. Phelps, who recently received his federal limited commercial license, is junior pilot with the Interstate.

A Luxurious Flying Yacht



The "PEGASUS" a standard type Sikorsky Amphibion with special cabin equipment, prepared for Mr. John Hay Whitney of New York, is perhaps the most luxurious private airplane yet constructed



Above—An interior view of Mr. John Hay Whitney's flying yacht. The ship is equipped with a sofa and four chairs, and will conveniently carry eight passengers. Ample luggage space is provided forward of the pilot's compartment and the toilet room is in the stern.

On the right—The "Pegasus" in flight, with ability to land at will, on either land or water.

SIKORSKY AMPHIBION

Built for men who appreciate and demand the utmost in Speed, Comfort, and Security in travel

SPEED

The Sikorsky Amphibion has a cruising speed of 110 m.p.h. and a high speed of over 125 m.p.h. In addition, its amphibian feature permits landing and take-off near the heart of the city, thus saving many hours of travel to and from outlying airports. *It Saves Time.*

COMFORT

For business or pleasure, a man who can afford a Sikorsky cannot afford to be without one. Nothing is lacking in its appointments to make flying a pleasure. *It Is Comfortable.*

SECURITY

This remarkable airplane will fly *and climb* on one motor. Plenty of reserve power and its ability to land when and where you wish, land or water, give a feeling of security no other plane can give. *It Is Safe.*

GUARANTEES

The Sikorsky Amphibion is *guaranteed* to have a high speed of over 125 m.p.h., is *guaranteed* to have a ceiling of *over* 20,000 ft., and is *guaranteed* to fly on one motor with pilot, mechanic, nine passengers and gasoline for five hours.

Illustrated literature upon request

SIKORSKY MANUFACTURING CORPORATION

COLLEGE POINT, LONG ISLAND, NEW YORK

Say you saw it in AERO DIGEST

PENNSYLVANIA NEWS

THROUGH the coöperation of the officials of the American Bank and Trust Co. of Hazleton, Wm. H. Veale, president of the Veale Aviation, Inc., was successful in having painted a large 60-foot circle, with arrow, on the roof of the aforementioned bank. It also has a large figure 4 painted inside the circle which will tell the airmen the good news, in this very mountainous country, that a landing field, suitable for any type ship, will be found four miles due north of the city.

THE Interstate Flying Corp. of Philadelphia, has been appointed dealer for Challenger airplanes for Philadelphia and vicinity.

ROBERT S. MOORE has resigned from the Aeronautics Branch, Department of Commerce, to engage in engine manufacturing at Scranton, Penna. He has joined the F. Wesel Manufacturing Company. A five-cylinder radial engine of 125 horsepower will be marketed under his supervision early next year.

Mr. Moore was associated with Emile Berliner in the marketing of the Gyro engine, America's first rotating airplane engine; consulting engineer and chief of inspection on Rhone production during the war; and with the Supply Division of the Air Corps during post-war years.

THE city of Hazleton has arranged with Mr. William H. Veale, president of Veale Aviation, Inc., to use that company's field as a municipal airport. The Veale company offered the city the use of the field free of charge. Henceforth, the field will be called Hazleton Municipal Airport and Veale Aviation, Inc.

DAWSON Aircraft Corporation has just been formed in Pittsburgh to handle the distribution of International planes, which are manufactured by the International Aircraft Corporation, Cincinnati, Ohio, and also to engage in student instruction and general commercial flying. The president of this company is R. F. (Joe) Dawson, well-known pitcher for the Pittsburgh Pirates.

Dawson was chief machinist's mate and also an instructor of flying at the Naval School in San Diego during the war, and has been actively interested in aviation ever since. His new company will operate from Rodgers Field, Pittsburgh.

THE dedication of Hazleton Airport—Veale Flying Field at St. Johns was recently celebrated with a two days' aerial program. A large crowd gathered to witness the flying of about thirty planes which came to the airport on this occasion.

Planes from both the Army and Navy air service were present. Bob Hewitt headed a fleet of planes from Pitcairn. Major H. A. Dargue, of Pan-American flight fame was among those present. W. H. Veale arranged the meet.

The Philadelphia Aircraft Show

GRAPHICALLY depicting the development of aviation in the Philadelphia district since the early experimental days of twenty years ago, the first annual Philadelphia Aircraft Show will be staged from November 3 to 10, in the 108th Field Artillery armory, under the auspices of the Aero Club of Pennsylvania.

Major J. Sydney Owens, commander of the 28th Division Air Service, Pennsylvania National Guard, and Commander Ralph D. Weyerbacher, in charge of the Naval Aircraft Factory at the Philadelphia Navy Yard, are supervising the arrangement of airplanes and other military aviation exhibits representing their branches of the service.

There will be exhibits from aviation organizations throughout the state, Southern New Jersey, Southern New York, Delaware and Eastern Maryland. Among the types of planes that were entered in advance of the show's formal announcement are the American Eagle, Bellanca, Challenger, Consolidated, Curtiss, Eaglerock, Fairchild, International, Keystone, Monocoupe, Pitcairn, Ryan, Stinson, Swallow and Waco.

On the show committee are: Edgar N. Gott, president of the Keystone Aircraft Corporation, Bristol, Pa.; Charles Townsend Ludington, president of the Ludington Philadelphia Flying Service, Inc.; J. Wesley Smith, president of the Aero Service, Inc., of Philadelphia, Camden and Atlantic City; W. R. Huntsman, general manager of the B. B. T. Corporation of America, Philadelphia; C. W. Larner, president of the Keystone Flying Corporation, Philadelphia; Major Owens and Commander Weyerbacher.

Philadelphia Airport to Get Class A 1 A Rating

THE Airport Equipment Division of Philadelphia has been awarded the contract for the erection of one of the largest and best equipped units yet to be built at the Philadelphia Municipal Airport for the Ludington Philadelphia Flying Service, Inc. This commodious, metal, 80′ x 100′ hangar will embody the very latest features of hangar design, and when completed will give the field a class A 1 A rating.

The large two-story leanto 30′ x 100′ x 20′, to be built on the side of the hangar facing the field, will house the general offices of the Philadelphia Ludington Flying Service, the local office of the Department of Commerce and that of Pitcairn Aviation. Besides these, this building will include two large, comfortably appointed rest rooms, two large classrooms for students, and a lounge equipped with wall maps, charts, writing tables for pilots.

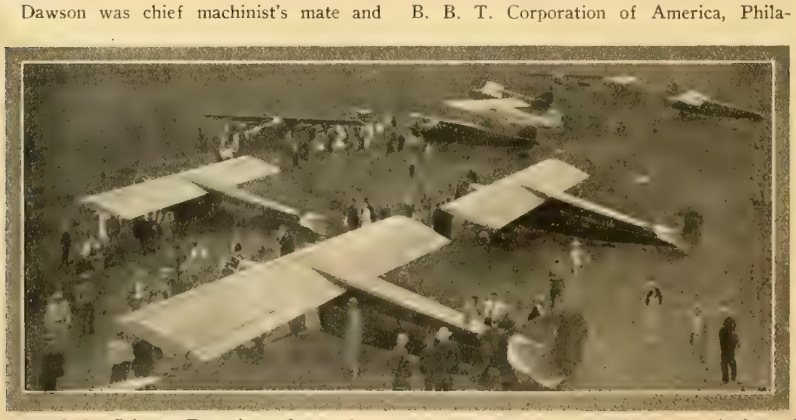
RECORD CONSIGNMENT BY AIR MAIL

A HUGE consignment of 350,000 advertising letters, weighing 19,000 pounds, was forwarded by air mail from Lansing, Michigan, August 21 by the Reo Motor Car Company. This mail was taken off from Lansing airport in seventeen Stinson-Detroiter planes operated by the Thompson Aeronautical Corporation and was transferred to transcontinental air lines at Cicero Field, Chicago, two and one-half hours later.

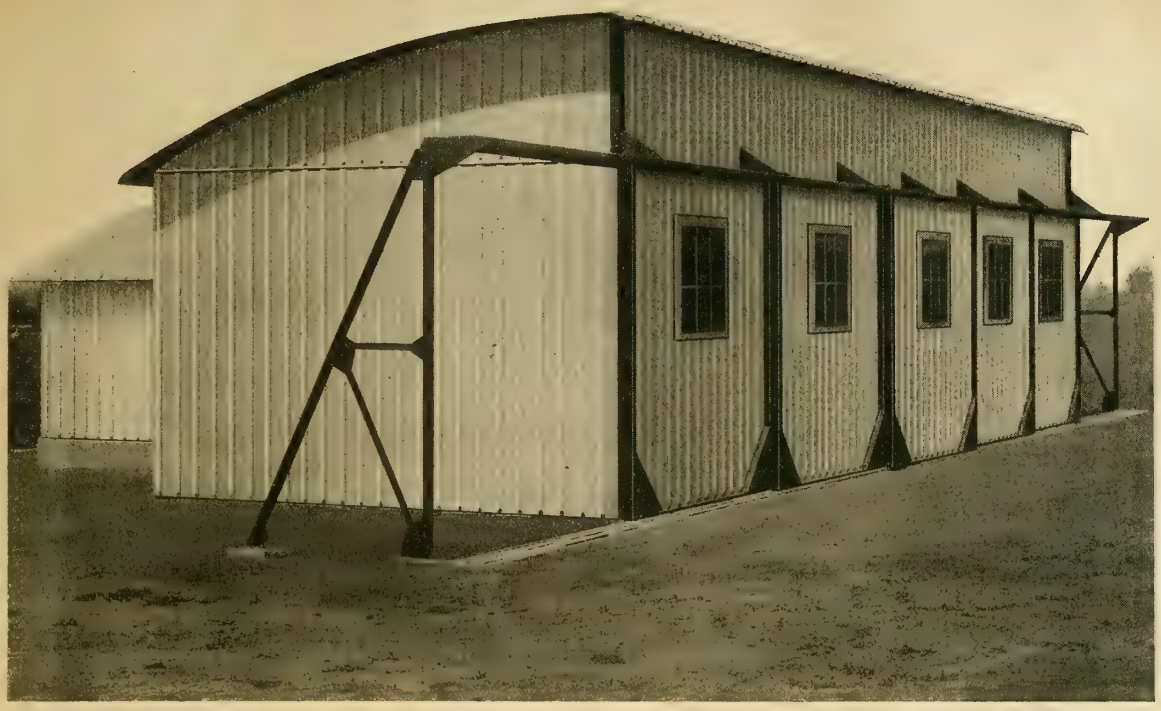
At the rate of 5c per letter, the Reo Motor Car Company paid $17,500 in postage, which amount constitutes a record for a single consignment of air mail.

R. C. (Tex) Marshall, vice president and general manager of Thompson Aeronautical Corporation, superintended the handling of the cargo and led the fleet of mail planes from Lansing. Other pilots who flew the seventeen planes are: George W. Hill, Thompson Aeronautical Corp., Chicago; C. W. Pickup, Thompson Aeronautical Corp., Kalamazoo; Ralph DeVore, Thompson Aeronautical Corp., Cleveland; Clifford W. March, Thompson Aeronautical Corp., Cleveland; Fred A. Jones, Thompson Aeronautical Corp., Cleveland; Eddie Preston, SKF Airways, Lansing; A. F. Alspack, Wayne Flying Service, Ft. Wayne, Ind.; W. P. McFail, Northern Air Lines, Minneapolis, Minn.; Jack Byrne, Furniture Capital Service, Grand Rapids; D. F. Hunter, Cedar Rapids Airways, Cedar Rapids, Ia.; J. H. Skoning, Grey Goose Air Lines, Chicago; E. E. Basham, Stewart Aircraft Co., Cleveland; L. M. Steward, Central Airways Corp., Chicago; John L. Huber, Central Airways Corp., Chicago; Lyle A. Thro, Central Airways Corp., Chicago; George W. Hopkins, Stinson Aircraft Corp., Detroit.

John L. Ruden, Thompson field manager at Chicago, was in charge of the arrangements for landing the mail at Cicero Field.



Some of the Stinson-Detroiter planes that transported a record consignment of air mail —350,000 advertising letters weighing 19,000 pounds.



On the Page Field

— in Lincoln, Nebraska, you will find this Butler Steel Hangar, which is owned by Woods Brothers. This is the individual type of Butler Steel Hangar. This type reduces the fire hazard, eliminates tampering with plane, allows absolute privacy, saves time in getting out of the building and is economical in cost.

Large or Small Hangars

Butler Steel Hangars are made for one or many planes. They are constructed with 24 gage tight coated galvanized steel, noncombustible, fire-resistant. Each sheet has deeply paneled corrugations which are deeper and wider, stronger and sturdier than mill rolled corrugations. Sheets are bolted together and to the steel frame with galvanized bolts, which provides high salvage value, weather tightness and prevents loose, rattling sheets.

Doors Easily Operated

Doors are rigidly constructed and arranged so that they open and close easily.

Butler Steel Hangars have good lighting arrangement. They may be enlarged any time economically. They may be taken down, moved and re-erected at least expense.

BUTLER STEEL HANGARS are fire-resistant

Send for Prices

Prices f. o. b. plant or erected. An inquiry will bring descriptive literature and price on size hangar desired.

BUTLER MANUFACTURING COMPANY

KANSAS CITY, MO. MINNEAPOLIS, MINN.

NEW YORK AIR NEWS

CAPTAIN SIR GEORGE HUBERT WILKINS, on his Arctic flights and his journey afoot over polar pack ice, carried Mirakel 5 power binoculars. These binoculars were presented to him by Vilhjalmur Stefansson. Because of their light weight, Wilkins and Eielson could carry these glasses without inconvenience together with their scientific instruments, guns, ammunition, etc. Heavier glasses would probably have been abandoned.

The 5 power binoculars are of such size that they may be carried around the neck without the case, or tucked into a pocket. The low magnification of these glasses, because it eliminated the magnitude of vibration and thereby aided steady observation from the plane, was especially adapted to such a flight as that of Wilkins and Eielson.

PRODUCTS of the Alexander Aircraft Company are to be distributed in the New York Metropolitan Area by a company to be formed under the direction of Arthur LaRoe.

Heretofore, LaRoe has been practicing medicine, but all the while his heart and a great part of his mental faculties have been devoted to aviation. Arthur LaRoe is 37 years old and a native of New Jersey. Back in his high school days, he was building model airplanes, and when he graduated in 1909, he proudly presented a thesis entitled "Conquering the Highways of the Air".

In 1916, he received a degree from Jefferson Medical College. Then the war attracted him into the French Army Medical Service, 1916-1917. When America entered the war, he went into the A. E. F. From 1919-1923, he was associated with the United States Public Health Service, and since that time has engaged in private practice, including instruction of hospital staffs throughout the United States in the use of electricity in medicine.

Evidence of Dr. LaRoe's liking for things mechanical is shown by the fact that, for six years, he represented the Indian Motorcycle Co. in New Jersey and raced with their machines on both track and road.

LaRoe's first flight was a test flight in France. Since then, he has taken the Curtiss Civilian Course and has received a F. A. I. certificate. At Mitchel Field, Long Island, he later took the U. S. Army's course in Aviation Medicine and now holds a commission as Flight Surgeon, Reserve, with a rank of Captain, M. C., attached to 302nd Pursuit Group, Army Air Corps. At present he is taking the New York University evening course in Aero Engineering.

New York to Montreal Air Service

AN international airway route for passenger and mail transport will be opened on October 1 by the Canadian Colonial Airways, Inc., of New York City. Four-passenger Fairchild cabin monoplanes equipped with Pratt and Whitney Wasp engines will be used for the passenger service.

The northbound plane leaves Hadley Field, New Brunswick, N. J., at 7 a. m. daily, arriving at Albany at 8:30. It leaves Albany at 8:45 a. m. arriving at St. Huberts Airport, Montreal, at 11:15. The southbound plane leaves Montreal at 2:30 p. m. and arrives at Hadley Field about four hours later. This schedule is approximately eight hours faster than that of existing train service.

LIEUT. Commander James McReavy, U. S. N. (Retired), has been added to the staff of Black and Bigelow, Inc., air transport engineers, in which position he will undertake work related to the inspection, operation and maintenance of airplanes. A graduate of the U. S. Naval Academy, Lieut. Commander McReavy served overseas during the war. After being transferred to Naval Aviation in 1919, he was squadron commander at the Naval Air Station, Hampton Roads, Virginia, from 1924 to 1926.

John C. Worthington also recently joined Black and Bigelow in a similar capacity. During the war, Worthington served in the Marine Corps. Of late he has engaged in airport construction and site selection.

MR. R. E. P. ELMER has been appointed assistant general manager of the Sikorsky Manufacturing Corporation of College Point, Long Island. Mr. Elmer was formerly inspector of engineering material (aeronautics) and inspector of naval aircraft at Brooklyn and Dayton, resigning in 1922 as Lieutenant-Commander. He recently had charge of the details of the preparation of the transatlantic plane *Friendship*, coöperating with Pilot Wilmer Stultz and Mechanic Lou Gordon.

Night Course at N. Y. U.

A THREE year course in practical aviation, leading to a certificate of proficiency, is now offered by the Evening Engineering Division, in coöperation with the Extension Division, of New York University. This new course is intended primarily for those associated with practical commercial phases of aviation who are unable to attend the Guggenheim School of Aeronautics. Elementary problems of aircraft design, weather, equipment, airport construction, lighting, air transport and traffic questions are dealt with.

The course, which opened September 17, includes lecture and recitation classes as well as laboratory classes,—the latter to be conducted in the extension laboratories of the new building of the Daniel Guggenheim Fund School.

DURING the first week of September, Air Associates, Inc., sold twelve airplanes—three Lockheed Vegas and the balance Avians. The Vegas were sold to Senator John A. Hastings of New York, Standard Oil Company of New Jersey, and the Texas Oil Company, respectively.

Six of the Avians were purchased by William Brock and Edward Schlee, of Detroit, who have been appointed by Air Associates as dealers for northern Ohio for the Avian. The other three went to William H. Hooker of Bayside, Long Island, George Putnam, publisher, of New York, and H. B. Lundberg of the Driggs Airplane Company, Lansing, Michigan, respectively.

Air Associates, Inc., formerly distributor for the Avian in the eastern part of the United States, has been appointed sole representative of the A. V. Roe and Company, of Manchester, England, for the entire United States. The company also has been made eastern distributor for Goodyear airplane tires.

Curtiss Flying Service, Inc.

A NATIONWIDE airplane taxi service will soon be inaugurated by a new company which is to be known as Curtiss Flying Service, Inc. The new corporation will, in the near future, order complete equipment for approximately twenty-five flying fields to be located in key cities throughout the country. Also, the company plans to coöperate with existing flying fields in various parts of the country. Thus, the company will be in a position to offer aerial service either for short local or long cross-country flights.

Three "Universities" of the air for advance air training and regular aviation schools will comprise another feature of the company's service. Moreover, the company is to be the exclusive sales agent for the Curtiss Aeroplane and Motor Company. Casey Jones, who is now vice president of the Curtiss Aeroplane and Motor Company, is to be president of the new company.

Curtiss Flying Service, Inc., has acquired all of the assets of the old Curtiss Flying Service, and its financing will be underwritten by Blair & Co., Inc., J. C. Wilson & Co., and the National Aviation Corporation.

(*Continued on next page*)



Line-up of airplanes at Barrett Airways airport, Armonk, New York.

AN IMPORTANT ANNOUNCEMENT for the NEW YORK METROPOLITAN AREA



TO THE AIRMINDED PUBLIC:

In the very near future a company will be formed under my direction to distribute to the New York Metropolitan area, including Westchester and Rockland Counties and Long Island the various products of the

Alexander Aircraft Co.

including the new

EAGLEROCK

with center section and many other improvements. Note their announcement in this issue. Several are ready for a *very early delivery.* For the present I am handling this under my own name.

TO THE INDUSTRY:

For many years I have devoted a goodly portion of my time to the advancement of the cause of aviation. Happily, now, I shall be permitted to give to it all of my time and I shall do all in my power, in my humble way, to promote the general good of the industry.

• • •

TO EAGLEROCK OWNERS:

You may be assured that everything humanly possible will be done to render you the service ALEXANDER intends you shall have, and to make you happy and satisfied in your ownership.

• • •

TO ALL COMPETITORS:

I'm glad to meet you, fellows, and I want you to know that whatever competition my outfit has to offer will be clean, open, above-board, and with all good will and no malice, and never a knock. It's a fine ship you're selling, too. May you sell lots of them.

Airmindedly,

ARTHUR LA ROE

New York Office:
Room 1015
220 West 42nd St.

Residence:
102 Oak Street
Floral Park, L. I.
Phone F. P. 929

Demonstrations:
Curtiss Field
Garden City, L. I.

(New York Air News continued)

BINGHAMTON AIR NEWS

By John B. G. Babcock

AN air meet was held at Bennett Field here September 6th to 9th. One fatality marred its success, which occurred when Val Miner's plane collided with the plane flown by Joseph James while the two were rounding a turn at the field in a race.

Pilots taking part in the meet besides Miner and Bennett, were: S. B. Bishop of Mansfield, Pa., George W. Ketcham of Elmira, N. Y., Tex Perrine and William F. Miller of Oneida, Garner "Peg" Nagle of Towanda, Pa., Victor F. Rickard and George W. "Slim" Emerson of Schnectady, N. Y., Fred McGlynn of Syracuse, N. Y., Warren G. White and Ted Burke of Albany, N. Y., William A. Butters of Jamestown, N. Y., Burr W. Leyson of Endicott, Spencer Punnett of Rochester, N. Y., H. B. Sandford and W. M. Laughlin of Niagara Falls, N. Y., Rupert Herr and J. P. Jones of Lancaster, Pa., Warren E. Eaton of Norwich, N. Y., Richard "Whipstall" Botsford of Utica, N. Y., and Lieutenant Robert W. Morse, U. S. N., from the Naval Air Station at Anacostia, D. C.

THIS city can be easily found by night fliers hereafter, for the Binghamton Light, Heat & Power Co., has installed two 8,000,000 candlepower beacon lights on its sub-station in the central part of the town. They will rotate six times each minute, from dusk to early morning. The power company also has painted on the sign "Binghamton" in large letters and an arrow on the roof of the sub-station where the lights are located to guide pilots toward the landing field one mile north of the station.

TWO new fields have been dedicated in this section recently—at Hornell, N. Y., 120 miles west of Binghamton, and at Towanda, Pa., 60 miles south of Binghamton.

The Hornell field, about 100 acres in area and located three miles from the business center of that city, is operated by the Hornell Airways, Inc., while the Towanda field is owned and operated by the American Legion post in that town, the county seat of Bradford County, Pa.

CENTRAL NEW YORK NEWS

By Mildred Marvin

THE new Red Creek airport was dedicated on September 3rd. State Senator J. Griswold Webb, chairman of the joint committee for aviation in the legislature, Congressman John Tabor, and State Senator Charles J. Hewitt were the speakers of the day.

The field was purchased recently by the chamber of commerce at a cost of more than $10,000. Hangars have been erected on the airport.

THE newly lighted Amboy, Syracuse, airport was dedicated at a two-day air meet on August 22 and 23, and thousands of persons from all parts of Central New York witnessed the air show sponsored by Syracuse Post 41, American Legion.

Warren Smith of Perth Amboy, N. J., in his Huff-Daland biplane, won first prize in the 45-mile race, the main event of the day, and followed up his victory with an exhibition of stunting in Shorty Bittner's Swallow that won him first in that event. Gordon K. Hood, manager of the airport, was in charge of the event. Smith's big Huff-Daland, with a 180 h.p. engine, outclassed the five other planes entered which were powered with OX5 type, 90 h.p. motors.

The pony express race was won by Shorty Bittner of Syracuse. Ralph Haynes of Elmira, piloting a Waco-10, made the most perfect dead stick landing.

Amboy airport has been completely lighted, making it one of the best fields in the state. All obstructions near the field are marked by red lights; the field boundary is marked by green lights; and floodlights and a revolving beacon have been installed. New hangars have been erected.

NEW JERSEY AIR NEWS

By J. B. BAYLEY

THERE was more than the usual activity this month at the Teterboro Airport, due, of course, to the many Whirlwind ships that were serviced before the races. Practically all of the boys that were entered dropped in to make sure via a top overhaul.

Commander Byrd's new trimotored Ford stopped at the field a few days to have a Wright Cyclone installed in the nose mounting. This replaced the Whirlwind and greatly increased the ceiling and climbing ability of the ship, which is technically known as a 4AT No. 15. The new Cyclone has a G. E. supercharger turning over at 29,000 r.p.m. at an engine speed of 1,800 r.p.m., and develops 525 h.p. Other features that Bernt Balchen proudly pointed out to us were: most complete set of instruments ever assembled in a plane, wing inspection port on either side of the pilot's cockpit, complete radio installation, and special gas distribution system.

THE new standard of the Gates Day Aircraft Corp. was officially tested by Clyde Pangborne, before a crowd of ten thousand people, at this port on August 24th. Besides the exhibition of stunting, there were speeches by Clarence Chamberlin and Bernt Balchen.

THE Seaboard Air Line has opened up a passenger service between Teterboro and Washington using Ryan broughams. Although only in operation for three weeks, they have carried fifty-two passengers. The departure time is 4:30 p. m. each weekday arriving at Washington about 7 p. m. W. Patt is the chief pilot.

THE first carload of airplanes to be delivered in Newark was unloaded by Will Sulzberger, president of the Sulzberger Aircraft Corp., during the last week of August when he took delivery on six Eaglerocks. Sulzberger will open a flying school and taxi service at the new Newark Airport. His present school is in operation at Hanover where Guy Rudd and Al Krapish are instructors.

THE Shark River Airways has had a very successful season of sight-seeing from Asbury Park to Spring Lake and Lakehurst, using two Waco-10s. Over 1,500 passengers were carried without a single accident.

CRESCENT Air Service of Philadelphia has persuaded the business men of Tuckerton to prepare a field and erect a hangar on a plot near the outskirts of the town. The municipal government of Atlantic City has announced its intention of opening an airport late this fall on a 700-acre meadow known as Great Island. Many pilots have found the present location, Bader Field, insufficient for heavy traffic.

LAKEWOOD may now be readily identified from the air by a large sign on the gas tank of the Jersey Central Light and Power Company at Laurel Ave. The letters are five feet high, with a similar height yellow arrow pointing to the field.

"BIG JACK" ASHCRAFT, veteran commercial aviator, has returned to the Gates Flying Circus. Ashcraft was one of the star men with the organization until a year ago, when he left to stage several air meets, which were very successful.

WRIGHT FACTORY EXPANDS

THE first of three new wings being added to the original factory of the Wright Aeronautical Corporation, Paterson, N. J., has just been completed, and the construction of the other two units is well under way. With the completion of the new plant, including a recently constructed assembly and test unit with a floor space of 60,000 square feet, the entire Wright factory will cover 501,400 square feet. A sixteen-acre tract at Paterson, N. J., formerly owned by the American Locomotive Company, has also been acquired by the Wright Company.

The new wings will entail an expenditure of $50,000, and the equipping of a cafeteria, hospital, employment department, offices and machine shops, an additional expenditure of $450,000. These additions will provide facilities for the construction of about 500 "J" type engines per month.

A FEATURE which is attracting much attention recently at the DuPont Products Exhibit at Atlantic City is the showing of gasoline and oil containers similar to the equipment taken on the Antarctic Expedition. They are finished in orange Duco and are marked "Byrd Expedition". The equipment shown includes a Tydol aviation gasoline tank, Tydol gasoline can and a Veedol motor oil can. These were supplied to the Du Pont exhibit for display purposes by the Tide Water Oil Company of New York City.

STANDARDIZATION of the production of Fowler variable area wings, manufactured in New Brunswick, now facilitates quicker delivery of these wings. This will enable owners, the wings of whose planes are damaged, to make replacements with only a negligible loss of time.

BUFFALO
"a great industrial state"

Seven Sound Reasons Why
Industries Grow and Prosper in the Buffalo District

1. **DIVERSITY FACTOR**
   80% of articles listed in U.S. Census of Manufactures are made in Buffalo District Industries.
2. **GEOGRAPHIC LOCATION**
   At the foot of the Great Lakes—the natural transfer point for lake and rail, air, canal and motor transport.
3. **ECONOMIC ASSEMBLY**
   Short hauls on raw materials —low freight rates.
4. **HOME-OWNING LABOR**
   Steady work—continuing wages—low turnover—result in 60% of workers owning their own homes.
5. **CENTER OF BUYING AREA**
   Within 24 hours of biggest buying population in Canada and United States.
6. **PLENTY OF POWER**
   At the very door of world's greatest source of power—Niagara.
7. **GATEWAY TO CANADA**
   75% of trade between United States and Canada moves through Buffalo - Niagara gateway.

ANY community, whose manufactured products exceed in value and in volume those of entire states, stamps itself "a great industrial state."

Buffalo is such a community center!

There are now more than thirty of our sovereign states, each of which produces less in manufactures than the Buffalo area.

One Billion Dollars scarcely measures the value of the goods annually made in the Buffalo Industrial District.

That industrialists appreciate the present advantages, and the future possibilities, of Buffalo and its environs is clearly evidenced by new plant investments exceeding Twenty Million Dollars in recent months.

Executives are invited to write for the "INDUSTRIAL ANALYSIS of Buffalo and the Niagara Industrial District."

Industrial Department

CHAMBER OF COMMERCE

BUFFALO, N. Y.



One of a series of advertisements regarding the industrial advantages of the Buffalo District.

BALTIMORE AIR NEWS

By Edward Johns

SETTLEMENT of the controversy concerning just where and what Baltimore's new airport will be is not yet. So much storm arose when it finally was agreed by officials that the $4,000,000 airport would actually cost between $7,000,000 and $8,000,000 that the Baltimore Association of Commerce was asked to appoint a body of disinterested men to study and make a report on the project.

This was done, and the report urged the abandoning of the waterfront site which had been chosen and the purchasing of Logan Field, the present flying field, with enough adjacent territory to form an airport of considerable extent. Complications arose here, however, when city officials pointed out that part of the proposed waterfront tract would have to be included in the board's suggestion.

A compromise project is now being worked out which will include all of Logan Field, a tract of ground now being operated as a brickyard, and about two-thirds of the waterfront site. This would make a field of considerable extent—approximately 650 acres—and would reduce expenditures by about $2,000,000. The greater part of the waterfront site would be included in the project, and the things which were considered most desirable to the finished project, namely, a ship channel alongside the field and equal facilities for land and seaplanes, could be included.

TWO new services were begun by the Chesapeake Aircraft Company last month. One was its connection with the Eastern Shore bus lines, and the other the flying of freight to the eastern shore of Maryland for the May Company, a large department store. At present ten round trips are being flown each week.

Col. John A. Hambleton, vice president of the Pan-American Airways, is president of the Chesapeake Aircraft Company, and Major William D. Tipton, commanding officer of the Air Corps, Maryland National Guard, the vice president. Thornton T. Perry is sales manager. The concern is active in aerial mapping and photography and general passenger flights.

Five new Monocoupes were received at Logan Field by the Chesapeake Company, recently appointed distributor for the craft. The company also represents the Travel Air and Fairchild companies.

PARAGON ENGINEERS, INC., of Baltimore, have leased a larger factory to enable them to increase production of the Monoid propeller. They are also planning to start production in the very near future on a full line of lumber propellers.

A new propeller lathe, designed by Spencer Heath and built in the machine shop of Paragon Engineers, will be put into operation shortly. It has a capacity of 60 propellers daily.

STARLIGHTERS, INC., of Philadelphia and Salibury, has been appointed representative to handle the propeller in Philadelphia, New Jersey, Delaware and the eastern shore of Maryland, and Virginia.

WASHINGTON D. C. NEWS

By Sam Barker

AMONG the Department of Commerce men in Los Angeles for the air show and races were Wm. P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, and Clarence M. Young, Director of the Aeronautics Branch. Both have returned to Washington. Mr. MacCracken flew to Los Angeles, in a Department of Commerce plane as far as Chicago and thence by a Boeing and Western Air Express plane from Chicago to Salt Lake and from Salt Lake to Los Angeles. Mr. Young delivered a Department Laird plane to Inspector Brockman at Omaha, and after picking up a Stearman at Wichita, flew it over to Los Angeles where delivery was accepted by "Monty" Monton, the Department inspector at San Francisco.

THE Mount Vernon Airways Company, operating the Hybla Valley Airport and Hoover Field, has accepted delivery of two Eaglerocks which are being used for passenger flights over Mount Vernon and Washington.

FOWLER W. BARKER, of the Bureau of Foreign and Domestic Commerce, who flew to Los Angeles in a Fokker Universal, has returned after an inspection trip to San Diego, Wichita, and Colorado Springs.

THE National Airport, Inc., is hopping passengers at the rate of twenty a day using Wacos and Ryans, the latter when there are sufficient passengers to warrant using a five-place ship.

THE new Boeing single-seater fighter, which is said to be capable of over 200 miles an hour, is a favorite with Navy pilots stationed at Anacostia. Lieuts. Galloway and Irvine have been putting the new plane through its paces.

CHATTANOOGA NEWS

By James S. Lindsey

THE survey of the Chicago-Atlanta air mail route was started in this section upon the arrival of Alvin H. Smith, Superintendent of Airways, Department of Commerce.

Mr. Smith is making Marr Field his headquarters during his survey, and with the aid of Benjamin King, manager of Marr Field, Mr. Smith is mapping a route and determining the positions for beacons and emergency fields.

Postmaster Springfield has sent out a questionnaire to determine if there is enough mail to suggest a feeder-line from Chattanooga to connect with the main route. The proposed route between Chicago and Atlanta, under the proposed schedule, would not benefit Chattanooga so far as eastern mail is concerned, but the feeder line, such as the postmaster has in mind, would shorten the time from Chattanooga to New York by a day.

Interest is increasing in respect to the enlargement of Chattanooga's municipal airport. A bond issue is to be voted on in the November general election, which will be used to purchase beacons and field equipment and further to improve the field.

ALABAMA AIR NEWS

By Robert H. Brown

WITH Fall here activity toward establishing airports in the various towns in Alabama has increased. Sheffield is planning an airport near the Muscle Shoals projects. Troy has started a movement backed by the Rotary Club for an airport. Eufaula is planning on establishing the first class A field in Alabama. Montgomery is being prepared for a fight for a 600-acre municipal field, and an option on approximately 700 acres adjoining the field, making one of the largest airports in the South; and Selma is establishing an airport there.

THE Alabama posts of the American Legion, at a state convention at Huntsville last month, passed a resolution endorsing the work of the Bureau of Aeronautics of the Department of Commerce and of the United States Air Force Association for their splendid work in promoting aviation.

W. O. Browne, Southern Director of the United States Air Force Association, and Lieut. Donald C. Beatty, Alabama Director, flew to Huntsville during the convention and addressed the Legionaires.

PASSENGER tickets on the St. Tammany Gulf Airways, Inc. can now be purchased at the office of the United States Air Force Association, in the Lincoln Life Bldg. Free taxi service to Roberts Field is also provided.

ANNISTON, under the auspices of the Chamber of Commerce, is to stage an air derby October 4-6. The committee in charge of the arrangements are: E. C. Loyd, W. W. Robinson, L. B. Liles, C. S. Leyden, Wallace Aderhold, Paul E. Beard, S. J. Reaves, Robert Alston, Knox Ide, J. F. King, C. L. Buchanan, N. C. Wilbanks, P. A. Quinn, and J. A. Hardin.

CONSTRUCTION of a plant by the Southern Aircraft Corp. to manufacture the Messer three-place biplane is well under way at Birmingham, according to Glenn E. Messer, general manager of the company. The planes will be powered by Curtiss OX5 engines.

Officers of the firm are: A. R. Pryor, president and treasurer, P. R. McCormack, vice president and secretary, and Glenn E. Messer, general manager.

A NEW transcontinental airline passing through the southern part of the United States is being proposed by several southern cities. The route would link New York City with Los Angeles, via Atlanta, Montgomery, Ala., New Orleans, Houston, El Paso, Laredo, Phoenix to Los Angeles.

A conference of representatives from the cities along the route was held recently at San Antonio at which time an executive committee was selected. The members of the committee attending were: Major Walter R. Weaver, commanding officer at Maxwell Field, Montgomery; H. G. Watkins, Phoenix City; W. L. S. Gordon, New Orleans; Henry C. Clifton, El Paso; and Ike Washburn, of Houston. Major Weaver was selected to head the committee and also was elected first vice president.



Airplane Hangars

IDECO *Standard Steel Buildings for*

Airplane Hangars
Machine Shops
Factories
Assembly Plants
Office Buildings
Foundries
Power Houses
Garages
Freight Depots
Storage
Warehouses
Car Barns
Service Stations
Pier Buildings
Field Hospitals
Bunk Houses
Explosive Storage
Equipment
Buildings
Pump Houses
Engine Houses
Filling Stations

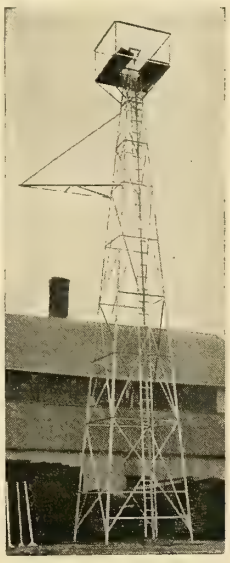
1 SPACIOUS—IDECO Hangars provide large, clear hangar space, unobstructed by columns. Roof trusses are designed to carry supplementary loads such as chain blocks for hoisting engines and equipment. Lights, windcones and meteorological equipment can be installed on the roofs.

2 RUST PROOF—Frames, sash and siding are hot dip galvanized. IDECO Hangars will not rust away in a few years. Painting is eliminated. The rust proof feature is particularly important where hangars are used for seaplanes or near salt water.

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TULSA AIR NEWS

THAT Tulsa is still the center of flying activity in the southwest is indicated by records of McIntyre Airport for the past 30 days, when 4,348 passengers were carried on 1,908 trips for a total of 104,560 miles. The passengers carried do not include pilots or other non-paying travelers such as prospective plane buyers and other dead-heads, but does include student training trips totaling 44 hours divided among 78 students enrolled in the McIntyre School. Of the total number of flights 360 were on regular schedule, carrying 840 passengers and 1,800 pounds of mail. The other flights, with the exception of the student training, were ordinary business or pleasure trips to various points in the mid-continent oil region.

Most of this flying was done with 24 different airplanes, including Wacos, Travel Airs, Stearmans, Swallows, Eaglerocks, Monocoupes, Stinsons, Ryans, Fords, Spartans and Jennies. Visiting ships, which average six per day, include practically every type of new and old model airplane.

Many of the planes used are owned by oil companies, oil drilling contractors and other Tulsa business men who use their machines in their daily business travel. D. A. McIntyre, owner of the airport, provides a Stinson monoplane and several Wacos for hire in general transport service. In addition to these, two other cabin planes are used in regular scheduled inter-city transport service, covering three different passenger routes besides the air mail route operated by National Air Transport.

Five airplane sales agencies use McIntyre Airport as their base of operations, and during the past 30 days, eight new planes were delivered, with orders booked for several more now waiting on delivery.

Visiting passengers totaled 540 during the month, and visiting planes together with those using the airport as a base consumed a total of 12,000 gallons of gasoline and 350 gallons of oil.

Hangar space for 26 airplanes in 11 hangars is always full, and most of the time half a dozen or more ships are parked outside the hangars. Motor and wing repair shops are always full, keeping 20 mechanics and 18 pilots busy.

Two other private flying fields are in use, and recent establishment of the new municipal airport has attracted several itinerant operators, who have found business good. Improvements under way at the municipal airport will make it an excellent flying field within another year.

Improvements at the McIntyre port include installation of more complete night flying facilities, such as boundary lights, new floodlights and hangar markers. Both day and night service is rendered at the port, with mechanics, pilots, ships and motor transport always available for emergency service to any point in the United States.

THE Spartan factory has moved into new quarters where it is expected soon to be on a quantity production basis. Wm. Collier, chief pilot of the McIntyre School, is building two new cabin monoplanes, and one or two other experimental planes are in the process of construction in Tulsa.

AT least three passenger transport line projects, with Tulsa as one of their main terminals, are proposed, with one new line definitely announced to begin operation in the near future.

THE Tulsa Chapter of the N. A. A. is active, holding regular meetings monthly with good attendance, and the Chamber of Commerce Aviation committee is efficient and functions promptly when desired.

OKLAHOMA AIR NEWS

THE Star Aircraft Company of Bartlesville, Oklahoma, has announced the following officers: John H. Kane, president; Billy Parker, vice president and general manager; E. A. Riggs, chief engineer; John Bain, secretary and treasurer. Directors of the company are: Frank Phillips, L. E. Phillips, Clyde Alexander, and William M. Davis.

Although the Star Aircraft Company is entirely a private enterprise, all its officers and directors, except Parker, Riggs and Bain, are also directors of Phillips Petroleum Company. Both Parker and Riggs have been in aviation work for more than fifteen years.

GEORGIA AIR NEWS

By Al Major

MR. WILLIAM B. HARTSFIELD, chairman of the aviation committee of the City Council of Atlanta, recently had the finance committee of the City Council to include in its budget for 1929 an appropriation of $100,000 to purchase Candler Field, Atlanta's municipal airport. Candler Field is now operated under a lease from Asa G. Candler, Inc., with option to buy for $100,000 before June, 1930.

JUDGE ALBERT S. WILLIAMS, State Commissioner of Finance and Taxation of the State of Tennessee, recently took his first airplane ride when he took four million dollars in securities from Nashville, Tennessee, to Atlanta.

The securities were due in New York the following morning to preserve the state's credit. They were posted at the Candler Field postal substation long before time for the northbound mail plane to leave the Atlanta airport. Judge Williams flew from Nashville in one of the 105th Aero Squadron planes, piloted by Lieut. W. G. Blackard, and arrived at Candler Field in an hour and fifty-five minutes after leaving Nashville. The Pitcairn mail plane known as the "Treasure Ship" took the four million dollars in securities to New York safely.

FLYING a new Douglas O-2H observation plane, Captain Charles T. Phillips of the War Department, in charge of all National Guard Air Units in the country, visited Candler Field recently. He was accompanied by Sergeant E. H. King. Captain Phillips is a native Atlantian; his mother resides here. He was on his way to Mobile, Alabama, to inspect the air unit of the Alabama National Guard which was in annual maneuvers at Mobile. Sergeant King is also a southerner, being a native of Knoxville, Tennessee.

ALBANY, GEORGIA, has announced an air derby and invites all pilots in this section to participate. The Chamber of Commerce of Albany has deposited in the bank $1,500 in prize money.



Fred L. Foster, mgr. of aviation sales, Alexis Klotz, pilot, and the Buhl Airsedan owned by the Naturaline Co. of America.

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LOUISIANA AIR NEWS

By Harold A. Dempsey

GILBERT J. FORTIER, chairman of the New Orleans Airport Commission, announces that the commission will continue its present policy to develop the Alvin Callender Field at Belle Chasse on the west bank of the river. The field is New Orleans' only municipal airport, and objection has been raised to it because of its location, nine miles distant from the heart of the city.

The commission will ask the city council to appropriate $50,000 to improve the field. This sum would make it possible to build a beacon, install floodlights for night flying, improve drainage conditions, and make the field otherwise more efficient for the use of all types of aircraft, from the smallest to the largest. The field already represents an investment in excess of $50,000.

Endorsement of the project to build another field on the east side of the Mississippi River at New Orleans, was given by the commission at its last meeting. It is estimated that from three to five years will be necessary to develop such a field for air mail, passenger and express flying.

AN airplane Good Will Tour of Louisiana and Mississippi will be conducted by the Menefee Airways, Inc., and the *Item-Tribune,* newspaper of New Orleans, starting October 9th. A scouting plane has covered the tentative route for the tour, making arrangements for landing and entertainment. Frank W. Gavin and James R. Wedell, sales manager and pilot of the Menefee company, are in charge of the plans.

The tour will be made up of New Orleans business men and officials and of community leaders from other cities of Louisiana and Mississippi. The route at present contemplated is: Bogalusa, La., Picayune, Hattiesburg, Laurel, Meridian, and Jackson, Miss.; Hammond, Monroe, Shreveport, Alexandria, Lake Charles, Lafayette, Crowley and Baton Rouge, La.

Among those who will go on the tour are Acting Mayor T. Semmes Walmsley of New Orleans, Travis Oliver, Monroe, La., and H. J. Cole of Hattiesburg, Miss., who states that four planes from his town will join in the tour.

THE Baton Rouge Chamber of Commerce has completed plans for the erection of an airport in East Baton Rouge parish, and a special committee has been placed in charge of the project.

THE St. Tammany Gulf Coast Airways, Inc., will inaugurate, around December 1st, mail service on the New Orleans-Laredo link of the New York-Mexico City line. This will hook up the longest air mail route in North America, making a continuous line from Boston to Mexico City. Five Fokker Super-Universals have been ordered for service on this line.

THE landing field at Crowley has been equipped with markers, making it possible for pilots passing over the city to distinguish the location without the aid of maps. On the roof of the Standard Oil plant in the city, the word "Crowley" is painted in chrome yellow on a black background. The letters are ten feet high and eight feet wide. A large arrow points to the landing field in the southern section of the city.

J. T. LONG, pioneer airman of Bogalusa, has brought to Bogalusa a Hispano-Suiza motored Eaglerock plane. It has a capacity of two passengers and pilot, and is equipped with Bendix brakes for landing. Mr. Long is preparing a modern air field on Superior Avenue.

CAPT. LOREN W. MENDELL of Fort Worth and San Antonio, Texas, has been assigned to New Orleans by the federal prohibition forces to assist in the enforcement of the dry law in this territory. His plane, a Vought biplane equipped with a Hispano-Suiza engine, will make daily trips along the Gulf Coast and over marsh and bayous near the mouth of the Mississippi River.

FLORIDA AIR NEWS

By Johnson Wright

LAURIE YONGE, veteran Jacksonville pilot, has established a new school at the Jacksonville municipal airport. In addition to the school, Yonge is operating a general flying service. Waco biplanes, for which he is sub-distributor, are being used.

JAMES G. RAY, operations manager for Pitcairn Aviation, Inc., completed arrangements for the use of the municipal airport and hangar space for three planes, during a recent visit to Miami. Pitcairn Aviation, Inc., has contracted to extend its New York-Atlanta line to Miami. Service on the extension will start December 1st.

DAILY air mail and passenger service was inaugurated September 15th between Miami and Havana when Pilot Edward Musick lifted the big Sikorsky S-38, of the Pan-American Airways, off their private airport at Miami. 1,344 pounds of first class mail were carried on the initial trip. All first class mail between Miami and Havana, whether bearing air mail stamps or not, will be carried by these planes.

The operation of their service from Miami to Havana instead of from Key West as they have for the past year saves the mail one entire day.

Extensive preparations are being made for the operation on a large scale of the Miami-Havana line and the extension to San Juan, Porto Rico, which will commence December 15th. Contracts have been let for the construction of a passenger station at the airport to be completed not later than November 15th. Construction is also under way on another steel and concrete 100′ x 100′ hangar.

A new B B T air mail type floodlight and General Electric boundary lights have been installed. A complete lighting system is now in operation at this airport, a General Electric revolving beacon having been installed last spring.

Ticket offices have been opened at 44 Biscayne Boulevard, and an engineering office is maintained in the Shoreland Building. Arthur E. Curtis has been named Miami passenger agent for the line and has assumed his duties. V. E. Chenea, traffic manager, has been very active in the organization of the Miami terminus.

Key West will be abandoned by the line on December 15th when the flights to and from Havana are made non-stop.

HIALEAH AIRWAYS, operator of the 54th Street airport, Miami, and state distributor for Travel Air, has been purchased by E. C. Clifford of Albany, New York.

Ocala Flying Field

OCALA'S newest flying field has proved to be a favorite attraction during the summer months. The field is located five miles east of Ocala, near Silver Springs. Hundreds of people visit the springs every week and many of them stop at the airport to take the popular ten-minute air ride down the Silver River.

The flying field is owned and operated by the Florida Aviation and Airways Corp. A combination hangar, shop, and waiting room has been erected, and complete gas and oil facilities are available to the visiting flier. Plans are now under way for enlarging the field.

The Florida Aviation and Airways Corporation was formed recently by a group of Ocala business men. H. J. (Doc) Chiddix is manager of the company; L. E. McLaughlin, chief pilot; Joe Borden, secretary and treasurer. In addition to the Waco dealership for Marion and Alachua counties, the company conducts a flying school and operates an aerial taxi service.

SOUTH CAROLINA NEWS

ANDERSON AIRWAYS, INC., has been formed at Anderson, South Carolina, to handle the distribution of International planes in the states of North and South Carolina. A general commercial aviation business, including student instruction, passenger hopping, aerial taxi service, etc., will be engaged in. The Anderson Airways contemplate doing considerable crop dusting in addition to the regular commercial activities.

T. F. Drake will be president of the new company, and Dexter C. Martin will be vice president and general manager.

DALLAS AIR NEWS

MR. C. W. SHAW and Lieut. E. H. Rice, both of Travel Air Ways Co., returned recently from a trip north during which they visited aviation schools and factories ranging from Detroit to Dallas. At Moline, Illinois, Mr. Shaw completed arrangements with Mono Aircraft, Inc., for the distributorship of Monocoupes in Texas. Mr. Howard Woodall, also of Travel Air Ways, took delivery on a demonstrator, which he flew back to Dallas. Mr. Woodall, flying a stock model Travel Air, was high man at the recent dedication meet of the Shreveport airport.



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CHICAGO AIR NEWS

By Duke Jordan

CHICAGO claims to be the first to establish a consolidated union ticket office for air passengers. The new ticket office, which opened September 8, is in the Palmer House, one of the city's oldest hotels, now modernized, at Monroe and State Streets in the heart of the city.

The office was opened under the direction of Thomas Wolfe, Jr., president of the Chicago Air Traffic Association and Walter L. Gregory, manager of the Parmelee Transfer Company. Attendants under the supervision of Robert L. Woodcock, manager of the passenger bureau, are on duty from early morning until 9 o'clock at night to make reservations.

Members of the Air Traffic Association, which is behind the project, include: National Air Transport, Inc.; Embry-Riddle Co.; Robertson Aircraft Corporation, and the Boeing Air Transport, Inc.

THE Robertson Aircraft Corp. has established a three-hour passenger service between here and St. Louis. The ships make stops at Peoria and Springfield. Three Ford-Stout all-metal monoplanes are being used in the service and three more will be added when it is extended to Kansas City and Omaha.

SWEET PEAS from Ogden, Utah, are being delivered here by plane three times each week. The first shipment of 100,000 flowers left Ogden in a Scenic Airways ship and was transferred at Cheyenne to a Boeing airline plane.

EIGHT members of the ground crew at the National Air Transport hangars decided to get off the ground, so they organized the N. A. T. Mechanics' Flying Club and purchased a Swallow. The members are Luther Harris, field manager of the N. A. T. here, H. L. Kinsey, Howard West, Joe Baltrusis, Charles Weaver, Ray Dehority, Don W. Tyler and Elmer Pearson. They are receiving daily instruction from air mail pilots.

MORE than 50 pilots, air traffic managers and air mail operators attended a dinner given in connection with an aeronautical exposition held from September 10-22 at the Boston Store, a large department store here. George Foster, chairman of the aero committee of the Association of Commerce, Commander R. M. Snyder of the American Legion Aviation Post, and Elliott White Springs, world war flier and author, were among the speakers.

More than 125,000 persons are reported to have attended the exposition during the first week. Motion pictures were shown five times daily and talks were given each day on aviation.

John H. Murphy, of Des Moines, was in charge of the White Aircraft Company's exhibit, while J. E. Schaefer told the good points of the Stearman ship. Jack Lowe handled the showing of the American Eagle.

Among the exhibitors were: Atlantic Aircraft, Kari-Keen Aircraft, Westinghouse Electric, Johnson Airplane Co., Elgin National Watch Co., American Eagle Aircraft Co., International Life Saving Cup Corp., Canvas-Leather Specialty Co., Charles A. Arens, Stewart-Warner, Mono-Aircraft, Hamilton Aero, Stinson Aircraft, Paragon Engineers, U. S. Post Office, General Electric, Balsa Wood. Thompson Bros. Balloon and Parachute Co., Illinois National Guard Air Corps, Rand McNally, Wallace Aircraft, White Aircraft, Dragonfly Aircraft, U. S. Airplane, Grey Goose Airlines, Monarch Aircraft, Universal Airlines, Vacuum Oil, Pioneer Instrument, Heath Airplane Co., B. F. Goodrich Rubber Co., A. G. Spalding & Bros., Esline Co., Ostergaard Aircraft, Chicago Aeronautical Service, Aero Photo Service, Fairchild Aerial Camera Corp., Westinghouse Lamp Co., Swallow, Travel Air, Valspar, National Air Transport, Chicago Flying Club, Chicago Aerial Survey, Jack Oates, Fairchild Aviation Co., and the U. S. Naval Aviation mechanics school.

ANOTHER exhibit, sponsored by the Chicago Flying Club, was announced for October 7, at the club's field, Eighty-second Avenue and Irving Park Boulevard, on the northwest side of the city. According to S. L. Priestman, secretary of the club, more than 50 ships will be shown.

UNIVERSAL AIR LINES has established service between Chicago and Cleveland. Pilots George Brew and Elmer Kane carried six passengers on the first trip, September 15. Two planes leave here and Cleveland daily, in the morning and afternoon.

EAST and northwest were connected last month by coördinated rail and air passenger service when the Transcontinental Air Transport, Inc., began the operation on definite schedule of passenger carrying planes between Chicago and Minneapolis and St. Paul. The service will be participated in by the Pennsylvania Railroad and the Northwest Airways, Inc., a subsidiary of the Transcontinental Air Transport, Inc.

JAMES R. FITZPATRICK, vice president and secretary of the Haskelite Manufacturing Company, has been asked to serve on two of the most active aviation committees of Chicago—the aircraft production committee of the Illinois Manufacturers Association, and the aviation committee of the Chicago Association of Commerce. Mr. Fitzpatrick has been in charge of the aviation material division of his company since its inception and has been intimately connected with all the trade associations of the aircraft industry.

THE Lincoln Aircraft Company, manufacturer of Lincoln-Page planes, has opened a new sales office in the Wrigley Building in Chicago. Erwin Baumgarth, who previously handled the Lincoln-Page sales in Chicago, has been appointed Chicago representative for the company. Mr. Baumgarth now flies the Lincoln-Page and has joined the list of the flying sales managers.

Southtown Aviation Club

THE Southtown Aviation Club of Chicago gives a ninety-day technical ground course with classes meeting on Tuesday and Friday evenings. Flying instruction is given at the club's Southtown airport, located at 87th St. and Harlem Ave. There is a waiting room, rest room, lunch room, and parking space at the field and hangars are in process of construction.

Carl J. Buehler is president; Warren W. Stautz, vice president; Earl A. Sanborn, secretary; Lawrence H. Burns, treasurer. In addition to these officers, the directors are Chester H. Gebo, Grant M. Smith, and J. R. Mills.

IOWA AIR NEWS

By R. W. Moorhead

FOUR more cities in Iowa have been placed on the air map. They are Manilla, Lake City, Waukee and Kalona.

Seventy-two cities in all are now marked in Iowa. Besides the four new ones the others are Des Moines, Cedar Rapids, Waterloo, Creston, Boone, Nevada, Ida Grove, Olds, Blencoe, Lenox, Bedford, Atlantic, New Sharon, Riverside, Osage, Stuart, Delta, Madison, Oskaloosa, Shenandoah, Jersey, Clarinda, Leon, Truro, Sac City, Montezuma, Fairfield, Carroll, Glidden, Ralston, Manning, Templeton, Dedham, Halbur, Arcadia, Breda, Lidderdale, Lanesboro, Coon Rapids, Newburg, Oelwein, Waverly, Missouri Valley, Lynnville, Decorah, Iowa Falls, Barney, Williams, Greenfield, Mapleton, Fort Dodge, West Union, Churdan, Sibley, Council Bluffs, Manchester, Minden, Clarion, Charles City, Keosauqua, Rockwell City, Humboldt, Cresco, Gowrie, Bloomfield, Manson, Washington and Ogden.

YELLOW CAB AIRWAYS, INC., at Des Moines, has carried in safety 3,388 passengers, making 2,535 flights from June 16, 1928 (opening date) to August 31, 1928. Since August 31st the figures have increased and the record is one of safety, although the figures are not yet available.

The company was organized by Russell Reel, owner of the local Yellow Cab taxi cab service. The company offers flying instruction and pleasure flights as well as commercial flights, and also has Fairchild, Monocoupe and Travel Air sales.

DES MOINES has at this time two airplane factories, thirteen planes owned privately by Des Moines citizens, and also has, within twenty minutes' drive of the city, a complete hangar. The city is also served by two air mail lines.

Electric boundary lights now mark the landing area at the city's airport. A 1,000,000-candle power beacon guides incoming fliers to the field, and good floodlights illuminate the runways. The newly constructed steel hangar is considered to be one of the most up-to-date in the country.

The two companies here engaged in the manufacture of aircraft include Henry Bolte, who builds open and cabin ships, and Burd White, who builds the Whitey sports plane.

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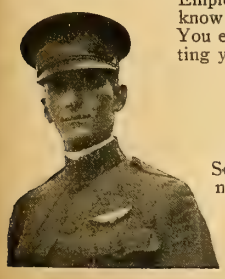
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DETROIT AIR NEWS

By Frank Bogart

SUCCESSFUL tests of the first Diesel type oil-burning aircraft motor by the Packard Motor Company's airplane division and the announcement of reorganization of the Stinson Aircraft Corporation, with a refinancing program which will permit erection of a new factory, multiplying production by three to five times what it now is, were the outstanding events in Detroit aircraft circles in September.

No less important to those closely interested was the splendid showing made by the Warner Motor Company's new 110 horsepower Scarab radial, air-cooled engine in the New York-Los Angeles Class A derby for light planes. Five of these engines began the race. All finished. Four were in the first six positions; the other ran tenth. Warner Company is now producing one a day and is soon to go higher.

CONTINENTAL MOTORS, INC., long an important producer of automobile engines and other power plants, and long rumored to be ready to enter the aeronautic field, has completed its plans and early next year will put out a series of three air-cooled types, of five, seven and nine cylinders each. Robert Insley, former assistant chief of the power plant branch of the Army Air Corps at Wright Field, Dayton, Ohio, will be in charge.

PACKARD, says Colonel J. G. Vincent, vice president in charge of engineering, may be another year in perfecting its Diesel motor for commercial marketing, but it will be done. Captain L. M. Woolson, head of the aeronautical engineering division of Packard, is given credit for the success of the Diesel type.

The engine weighs substantially the same as other current aircraft engines, that is about three pounds per horsepower. It has 200 h.p. and is a radial, air-cooled type. It uses about one-fourth less fuel than a gas engine does, and the cost of the oil is about half that of gasoline. It does away with gasoline and ignition systems, carburetors and all the other troublemakers and has many fewer parts than the present aircraft engines. Fire hazards are removed entirely. The interference with radio broadcasting from airplanes with electric ignition systems will also be avoided.

THERE are slightly more than 2,500 licensed pilots registered with the aeronautics bureau of the Department of Commerce, the records as of September 15 showed. Of these 140 are in Michigan, which is exceeded by only three others, California, New York and Illinois, in the order named. About 133 planes are owned and operated in Michigan, more than half of them in Detroit —and yet the governing bodies of both the city and Wayne County dally over settling the $2,000,000 municipal airport purchase. There are 193 students in training for pilot's licenses.

THE report was circulated recently that the Ford Motor Company was interested in a $1,500,000 airport at Philadelphia, but a promoter, heedless of the difference between the Ford Motor Company, Stout Metal Airplane Company, a division of the former, and Stout Air Services, Inc., separate entirely from both of the others, was responsible for the mis-statement. William B. Stout, head of the Air Services, which is purely an air transport operator, using Ford trimotored planes, told a Detroit stock promoter that he might try to interest Philadelphia capital in an airport there, since he, Stout, ultimately proposed to operate from Detroit to Philadelphia, via Cleveland and Pittsburgh. The promoter informed the entranced Philadelphians that Henry Ford was going to enter there. Both Mr. Stout and William B. Mayo, chief engineer of the Ford Motor Company, issued statements straightening out the matter. The airport may be built, and Stout planes may use it next summer, however.

Stout had his record month on the Cleveland passenger line in August, carrying 803 passengers and that traffic level was being maintained through September. This is roughly 60 per cent of the capacity of the planes on a two round trip daily schedule now maintained. A sixth trimotor was bought last month, and passenger service to Chicago will be begun in November.

WALKER AIRPORT, Walkerville, Canada, was opened September 8. With the completion of a municipal port in Pontiac, 25 miles north of Detroit, there are new safe fields in all directions from Detroit at which Detroiters may land and proceed to their homes or the business section with greater dispatch than if they were to land at any of the sites proposed for Detroit's own municipal airport.

THE Stinson reorganization was announced by Edward S. Evans, chairman of the board, Frank W. Blair, chairman of the Union Trust Company, and Harold H. Emmons, a director and counsel for the company, which has built 150 cabin planes this year. It began active production in August, 1926, and its balance sheet today is in excellent condition, with a surplus of $150,000, says Ralph Fordon, president of the Detroit Stock Exchange and member of the firm of brokers which is setting up the new stock issue of 140,000 no preference shares to replace the present 20,000 outstanding shares of Class A and B stock. The exchange will be on the basis of five of the new for one of the old, one each of A and B being paired to make a unit under the five-for-one plan.

"WINGS, INC.," has been formed by a group of aviation supporters to do a general airplane sales, servicing and storage business, and eventually to operate a training school for pilots and mechanics. State distributorships of Fairchild and Curtiss-Robin planes have been assured, and "Wings" also will stock the full line of the Pioneer Instrument Company, with other accessories to be announced later. Harry A. Graham, Stanley E. Knauss and C. V. Burnett are the principal officers, and Dearborn is the headquarters.

THE University of Michigan has the oldest full aeronautical engineering course of any American institution. It was established in 1917 and to date has had 97 graduates. The first one, William F. Gerhart, is now president of the Aeronautical Research Corporation of Detroit.

THREE quarters of a million dollars has been spent for new barracks and buildings at Selfridge Field since July, 1927, and a new appropriation for officers' quarters is now available. Lieutenant Ernest H. Lawson is this year's winner of the John L. Mitchell Trophy, won at the pursuit pilots' race in Los Angeles. Major Ralph Royce led his First Pursuit Group home from the Coast in three jumps totalling 16 hours' flying.

TWO Stinson-Detroiter six-place monoplanes have been shipped to Elmer J. Faucett of Lima, Peru, who expects to operate a regular passenger and mail line between Lima and the City of Galara, Northern Peru, a distance of more than 600 miles.

AS a result of tests made by Col. Charles A. Lindbergh, head of the technical committee of Transcontinental Air Transport, Inc., the company has placed an initial order for the delivery by February 1, 1929, of ten Ford trimotored planes equipped with Pratt & Whitney Wasp motors.

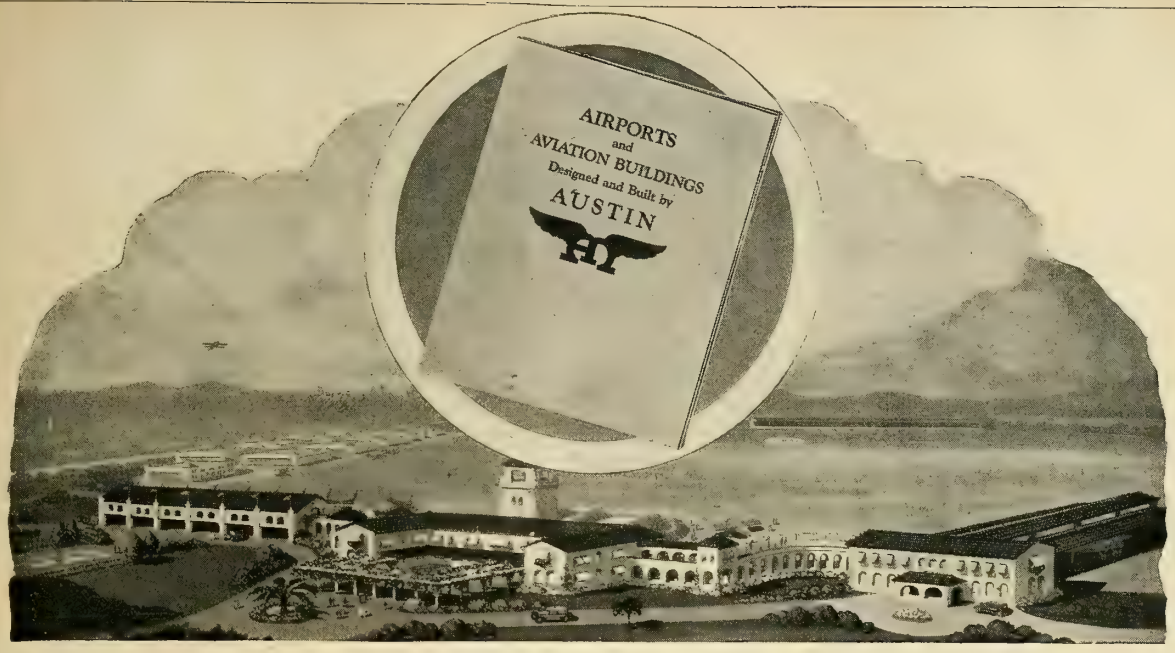
University of Detroit's Aeronautical Engineering Course

THE University of Detroit has added George J. Higgins to its faculty of the College of Engineering as Associate Professor of Aeronautical Engineering for 1928.

Mr. Higgins now holds the position of Associate Aeronautical Engineer at the Langley Memorial Laboratory of the National Advisory Committee for Aeronautics. In this position he was in charge of the variable density wind tunnel, model testing, and report writing. In addition he supervised the construction of their new high speed jet wind tunnel and their water tunnel.

The University of Detroit was one of the pioneers in establishing a regular undergraduate course of studies in Aeronautical Engineering, leading to the degree of Bachelor of Aeronautical Engineering. The course had its inaugural in 1921, with regular classes scheduled and conducted in September of the same year.

The engineering training offered students registered in the course of aeronautics, follows the general University of Detroit Plan of Co-operative Education. Under this plan the student spends alternative bi-weekly periods in the class and his industrial shop which are allied with his course of studies. And to this end the students are employed by the Detroit aircraft companies, which plan offers to the student the advantage of the modern facilities of the industry as well as enabling him to earn the major part of his expenses.



Airports, Factories, Hangars—

Designed and Built by Austin



Announcement

WILLIAM E. ARTHUR, formerly president of William E. Arthur & Co., Airport Engineers, and two principal members of his staff, have joined the Austin Company, of which Mr. Arthur will be Manager of the Airport Division.

The valuable experience which Mr. Arthur has had in designing several of the finest airports in the country, will further augment Austin's wide experience, extending over a period of more than ten years, in designing and building complete airports, hangars, aircraft factories and other aeronautical structures.

Mr. William E. Arthur will be located at Austin's national headquarters in Cleveland, but he and his staff will be available for any type of airport or aviation building project contemplated in any part of the country.



THE great forward movement of the aviation industry finds Austin prepared with a nation-wide engineering and construction organization with specialized training and experience in this field.

In a score of cities from Coast to Coast, Austin has designed and built factories, hangars and other aviation structures. Just completed are the new Fairchild plant at Farmingdale, L. I. and the Spartan Aircraft factory at Tulsa. A repeat contract with Boeing at Seattle is now under way, and one with National Air Transport at Cleveland.

Whatever you may be contemplating—whether a complete airport, a hangar, a new factory or extension—Austin's specialized experience can be of great assistance to you in planning soundly and economically.

Under the Austin Method the complete project—design, construction and equipment—is handled by this one responsible organization with guarantees in advance covering total cost, speed of completion, and high quality of materials and workmanship.

For approximate costs and other valuable information, and a copy of the new booklet "Airports & Aviation Buildings," wire, phone the nearest Austin office or mail the Memo.

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New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle Portland
The Austin Company of California: Los Angeles and San Francisco The Austin Company of Texas: Dallas

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AD 10-28

ST. LOUIS AIR NEWS

By A. W. League

THE new St. Louis to Kansas City and Omaha air mail line to be operated by the Robertson Aircraft Corp., will start as soon as lights and emergency landing fields have been secured, which is expected to be about November 1st. The equipment and personnel for this route is all ready to start. This new air mail route, which will connect with the transcontinental line at Omaha and the N. A. T. line to the southwest at Kansas City, will give to St. Louis a fast connection to the west coast and to the southwest. Practically the entire run will be made at night.

THE Robertson Aircraft Corporation has engaged four more pilots to handle the increasing air mail work and passenger service. Cloyd Clevenger, former test pilot for Alexander Aircraft Co., and author of "Modern Flight", is one of the pilots to join the Robertson staff. Clevenger is a former St. Louis pilot and has a host of friends at Lambert Field. Bert Isom, Charles Rausch and Walter Hunter are the other three pilots.

The new trimotored Ford passenger service inaugurated by the Robertson Aircraft Corporation is proving successful. The company had expected lean business until the line got under way, but an average of eight passengers has been carried daily.

The company has equipped its pilots with a snappy uniform. It is a blue coat with wings on the left breast, white flannel trousers and white yachting cap. The Fords are piloted by E. L. Sloniger and "Bud" Gurney with Pilots Murphy, Carrington and Isom as relief pilots. The air mail ships, which follow the same afternoon schedule as before, are piloted by Julius Johannpeter, Ray Fortner and Cloyd Clevenger.

"Bud" Gurney, formerly chief air mail pilot, has been promoted to the position of "manager of operations" for the Robertson Corporation. The position is a new one and was made necessary by the expansion of the company's activities.

A NEON light, which is of sufficient power to serve as a beacon light to aviators, has been erected on the top of a large tower located near the campus of Lindenwood College at St. Charles, Missouri. The sign will spell "Lindenwood College" in letters 3 feet tall. St. Charles is approximately five miles west of Lambert Field and is located on the air mail route from St. Louis to Kansas City and Omaha.

STATISTICS on the operation of commercial airlines centering in St. Louis will be used in a study of the economical side of aviation being compiled by Herbert Hoover, Jr., son of the Republican presidential nominee, who spent practically an entire day at Lambert Field, gathering data and making an analysis of commercial flying in St. Louis. Hoover is conducting a survey of airports throughout the United States for the Guggenheim Foundation of New York to study their outlook for commercial advancement.

AN air derby for model airplanes was held the first part of September on the old air mail field in Forest Park. The exhibition was sponsored by the B. Nugent & Bros. D. G. Co., which has organized a Junior Aero Club of 500 members, the majority of whom entered planes in the competition. The winners were awarded silver loving cups offered by the Chamber of Commerce, the *Post-Dispatch*, *St. Louis Star*, *St. Louis Times*, Robertson Aircraft Corporation, the St. Louis Police Board, Parks Air Lines, Col. John A. Paegelow, Commander of Scott Field, Nugents and others. Judges of the contest were Harlan Gurney, chief air mail pilot for the Robertson Company, and George Clark, president of the St. Louis Model Airplane Club.

AN aerial survey of the Mississippi River, from the mouth of the Missouri River above St. Louis to the mouth of the Ohio at Cairo, Ill., has been started by the Robertson Aircraft Corporation, on a contract from the War Department. A Ryan brougham is being used for the work. Its pilot is "Bud" Gurney and the photographic work is being done by a photographer of the Aerial Surveys, Inc., of Cleveland. The survey will cover 150 miles.

A NEW $2,000,000 company has been organized by the Gardner Motor Company and other interests to manufacture airplanes in St. Louis. Amos O. Payne, chief engineer of the Swallow Airplane Co. of Wichita, Kans., has resigned from that company to affiliate himself with the Gardner enterprise.

AN airport commission, consisting of ten members, which will have supervisory powers in the development of the new municipal airport to be built in St. Louis, has been named by Director of Public Welfare Salisbury. At the same time, he appointed a technical committee composed chiefly of airport architects and aviation experts, who will give the commission the benefit of their knowledge and suggestions. The Airport Commission is headed by Salisbury. The other members are Fred Pape, J. T. Muench, Louis Nolte, L. W. Harlow, Stanley Clarke, Harold Bixby, M. E. Holderness, Phil DeC. Ball, and Albert Von Hoffmann. The technical committee is composed of five members. They are Major A. B. Lambert, B. Russell Shaw, Phil Love, Preston Sultan and Maj. C. R. Wassal.

THE Von Hoffman Aircraft Corporation has received a photo contract from the Aerial Surveys, Inc., of Cleveland, Ohio. The contract calls for an aerial survey of certain sections of St. Louis and vicinity. A Ryan brougham, piloted by Lindon Roberts, will be used for the work.

THE 110th Observation Squadron of the Missouri National Guard has just ended one of the most successful two-weeks' encampments it has ever had. The division is composed of 87 enlisted men and 20 officers, and is rated as one of the best National Guard Divisions in the United States. Major Wassal, Commander of the Division, led a formation of seven planes in the flight from St. Louis to Nevada, Mo., where the 70th Infantry Brigade was encamped.

THE Radio Aircraft Corp. of Missouri, recently incorporated as a subsidiary of radio station WIL, has obtained a site in Granite City to construct an airport on which will be erected hangars, an office and buildings for a flying school. This field will be the fourth air field in Greater St. Louis. President of the corporation is L. J. Benson, who is also president of WIL.

THE Parks Air College now has an enrollment of 215 aviation students, while the mechanics school has 61 students on its rolls. K. L. Whitsett, instructor at Ellington Field during the late war, has been added to the Parks Air College instructing staff, which now has 13 pilots on its flying list. Since the school began operations last spring, 12 of its students have qualified as limited commercial pilots. There have been no failures. During the past month instructors at the Parks Field flew a total of 1,351 hours.

NIGHT classes for airplane mechanics will be started at the Parks Airport on October 1st. The night classes were made necessary by a contract entered into by the Parks Air College with a local manufacturing company to supply 200 graduate mechanics by February 15th, 1929. The course will cover all phases of airplane mechanics and engineering, including the construction and covering of fuselages and wings. Training and instruction also will be given on all accepted airplane motors, including Whirlwind, Wasp, Caminez, Liberty, Velie, OX5 and OXX6. The course will also include acetylene welding and aircraft sheet metal working. Lt. Richard F. Hardin has assumed charge of all ground instruction activities of both flying and mechanical courses at the Parks College.

PEORIA and Springfield, Illinois, have been made flag stops on the St. Louis-Chicago passenger line of the Robertson Aircraft Corporation. The fields at the two cities are none too good, and to avoid sticking in the mud needlessly, the big Ford monoplanes will stop at these two places only when it is known that passengers wish to leave or board the planes. In the latter instance, a field attendant will signal the pilot by waving two white flags.

THE Naval Reserve Flying Club, which is the only active flying club in this section of the country, is about to close its third successful flying season. The past season has been the most successful one of the three. Milford Sater, one of the members of the club, has passed his test for a transport license. Other members of the club who are ready to qualify for Department of Commerce ratings, which range from private to transport licenses, are: Martin Ford, Jess Herzog, Ted Lorenz, and Connie Brown. According to the chief instructor of the club, student pilots Proske and Campbell are about ready for their solo hop. These boys have had a pretty hard struggle to get in their flying time, and they deserve worlds of credit. Theirs is the school of "hard knocks".

NEWARK METROPOLITAN AIRPORT

Ready for America's Air Commerce

Finest Airport in the East complements PORT NEWARK'S unequalled rail, water and highway facilities

Twenty minutes from downtown New York, five minutes from the business center of New Jersey's metropolis and a stone's throw from the only rail-to-water port in New York Harbor, the Newark Metropolitan Airport enjoys a "close-in" position unrivalled in the metropolitan area! Planned and equipped with every known device to insure safe arrival and departure by day or night, it is admittedly the finest airport, from the standpoint of physical layout, in the East!

So obvious are its advantages of location and its facilities for accommodating air traffic that it has been selected as the New York terminus for United States air mail lines to New England, Chicago, the South and West as well as the metropolitan point of departure for leading passenger air-transport companies.

Newark Metropolitan Airport is undoubtedly destined to become one of the world's great airports. Now is the opportune time for manufacturers whose products have an outlet in the rapidly expanding airplane industry to consider the strategic value of adjacent plant location. For complete details concerning available sites and terms, address

THOS. L. RAYMOND, *Mayor*
Newark, New Jersey, U. S. A.

HIGHLIGHTS ON NEWARK METROPOLITAN AIRPORT

Area
500 Acres (175 now ready).

Runways
2200 ft. long, 800 ft. wide. Paved take-off strips 1000 ft. long, 200 ft. wide.

Surface
paved between hangars and take-off, to eliminate dust, mud and flying stones. General landing field hard rolled soil. Elaborate underground drainage.

Safety Provisions
Fire apparatus; hospital; boundary lights, gov't code radio station, beacon light; ceiling and cloud lights; all power and light wires underground.

Dept. of Comm. Rating
To be A1A.

Metropolitan New York Terminal for United States Air Mail



OHIO AIR NEWS

By T. E. Lunsford

A $15,000 bond issue to purchase a 155-acre site for Zanesville's municipal airport has been approved by the City Council. The approval of the council paves the way for another bond issue of $45,000 with which to equip the airport.

TIFFIN'S new airport was formally opened September 15. Fred J. Kishler is president of the Tiffin Airport Company.

THE Chamber of Commerce site on the Harrisburg Road has been recommended for the development of an airport site for Canton in a report of W. J. MacKenzie of the Department of Commerce.

JOSEPH W. SABIN of Cleveland, a former Akron man, has been appointed traffic manager of the Continental Air Lines, which operates the Louisville-Cleveland air mail line.

A TRACT of more than 1,000 acres lying north of the B. & O. and the Pennsylvania Railroad tracks and south of James road, near the Army Reserve Depot, has been selected as a site for the Columbus Municipal Airport. The City Council has unanimously passed a resolution which places on the ballot at the November election a proposal for a bond issue of $850,000 to build and purchase the site for the airport.

COLUMBUS is to be a stopping point on a passenger, freight, express and mail airway extending from New York to Kansas City, and from New York down the Atlantic seaboard, according to a statement by Warren B. Ferris, chief engineer for the Seaboard Airways, New York.

The western route would start in New York and go to Pittsburgh, Columbus, St. Louis and Kansas City. The southern route extends from New York to Norfolk, Charleston, Jacksonville, Miami and Havana.

THE Department of Commerce will equip Springfield's municipal airport with a lighted wind direction cone.

PROPOSALS that flying schools be established at state universities, that a state department of aviation be set up, and that a pilot's license law be enacted, were among matters approved by the joint legislative committee on aviation at a meeting held recently in Cleveland.

AN audience of 12,000 people recently attended the dedication of the Gallipolis airport. A squadron of army planes from Wright Field, Dayton, presented maneuvers.

The Gallipolis airport consists of more than 60 acres in the city limits near the Ohio River. It has two runways, one of 4,000 feet and another of 3,000.

THE United States Electrical Tool Company of Cincinnati has opened a new branch office in Denver, Colorado. Mr. L. B. Putnam of that city is in charge of the new office. Other "U. S." sales offices in the west are located in Dallas, San Francisco, Los Angeles and Seattle.

LIEUT. RAYMOND D. HARRIS has recently joined the International Aircraft Corporation in the capacity of chief pilot. He will have charge of the testing of all new planes manufactured in the Cincinnati factory, as well as certain testing in connection with experimental work which is going on constantly. Mr. Harris will also work with the sales department as a special sales representative. He is a lieutenant in the U. S. Air Corp Reserve and associated with the local unit which flies from Lunken Airport.

TOLEDO AIRPORT

MORE than three months of successful operation by the Transcontinental Airport of Toledo, Inc., have served to show the wisdom and public service of the originators in developing the airport.

The Toledo transcontinental airport is seven miles southeast from the business center and main postoffice of Toledo. It is a level, well drained tract of 515 acres, and is served by two steam railroads and a trolley line, besides highways.

The southeast 160 acres of the tract were set aside for the initial development. A hangar line for the first three hangars was established at forty-five degrees to the roads and near the southeast corner of the flying field. In the rear of this hangar line, a complete radio station for communication with pilots, other fields and Washington has been equipped and is in service. The station broadcasts hourly weather reports to pilots on the course. Also behind the hangar line shops, garage auxiliary airport buildings, and concessions have been erected.

Adequate equipment has been installed for night-flying activities. All adjacent pole lines and structures are indicated by obstruction lights, and runway lights complete the boundary lighting system of the field. An arc mechanism B. B. T. floodlight has been installed in a separate building adjacent to the hangar, where it renders most efficient aid in illuminating the field.

The Pennsylvania Railroad runs across the northeast corner of the property, and the Hocking Valley Railroad and the Toledo, Fostoria & Findlay trolley line border it on the west. A power line parallels the trolley line. The airport is surrounded by excellent highways, with two direct routes into the city.

In addition to being a regular stop on the transcontinental air mail between New York and Chicago, the airport is the southern terminus of a shuttle line to Detroit, by which the latter city becomes, in effect, a stop on the transcontinental air mail line. Planes arrive from and depart for Detroit four times daily to connect with the day and night mail planes from New York to Chicago and the day and night planes in the opposite direction.



The Toledo transcontinental airport.

CLEVELAND AIR NEWS

By David E. Irwin

A SECOND air-rail hook-up for Cleveland was inaugurated last month, when the Universal Air Lines, Inc., operating Hamilton passenger planes to Chicago, went into service. The line is to take passengers from the New York Central lines coming from New York and whisk them to Chicago in two hours and 45 minutes.

Two round trips a day are operated between Cleveland and Chicago, while at the Chicago end other lines of the company extend to Minneapolis, Duluth and Fargo, N. D.

Each of the Hamilton planes will seat 7 passengers and accommodate 50 pounds of baggage per passenger. A. B. Bone, Jr., is division passenger traffic manager here for the line.

DAVID S. INGALLS, the navy's war ace and flying Ohio legislator of Cleveland, has completed the plane in which he will enter the competition of the Guggenheim safe aircraft competition.

The plane was designed by Heraclio Alfaro, aeronautical engineer. It is a monoplane of the cabin type and has a high flying and low landing speed. Test flights were made at Cleveland airport recently. It is probable that a company will be formed to manufacture the ships for the market.

A NEW airplane motor has been designed by Charles Schlenker, Cleveland mechanic. The head resistance surface of the engine is only 21 inches in diameter. It is a six-cylinder engine, vacuum cooled, reverses instantly and gives six explosions to a single revolution of the crankshaft.

(*Continued on next page*)

THE CHICAGO SHOW IS YOUR SHOW!

The show to be held in Chicago Coliseum December 1-9 IS YOUR SHOW—DIAGRAMS ARE NOW READY AND SPACE IS AVAILABLE—THIS WILL BE A BUSINESS GETTER FOR 1929—The racing season is over and this exposition will be an opportunity for you to show what you have to offer for next year

International Aeronautical Exposition

Under the auspices of

The Aeronautical Chamber of Commerce

of America, Inc.

THE TIME—

DECEMBER 1st to 9th

—THE BUYERS WILL BE AT The CHICAGO SHOW—These buyers will be from *foreign markets* as well as domestic—This is assured by the reports of the attendance expected at the approaching International Civil Aeronautical Conference in Washington.

THE PLACE—

CHICAGO COLISEUM

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FOR SPACE INFORMATION, ETC., APPLY TO
AERONAUTICAL EXPOSITION CORP.
300 MADISON AVE., NEW YORK CITY

(Cleveland Air News continued)

Schlenker's company is named the American Airplane Motor Co., and with him in it are George and William Marsh and George McManus.

CLEVELAND may become a point in a new air mail route from Norfolk, Va., to Detroit. A proposal by Pittsburgh interests for a new route between Washington and Pittsburgh was broadened to include the possibility of a Norfolk to Detroit line, intersecting the north and south trunk line at Washington and the transcontinental route here.

A BRANCH office has been established here by the Chicago Aeronautical Service, Inc., with offices in Chicago.

The company is especially active in making aerial surveys, doing aerial advertising and photography. It also offers training to prepare for entering the aviation field, having an arrangement whereby instructors of the Great Lakes naval training station conduct the work.

THREE aviation companies here have begun night passenger flights over the city —Stout Air Services, Inc., Stewart Aircraft Corp., and the Cole School of Aviation.

SEVENTY-FIVE members of the 462d Aero Squadron gathered in Cleveland last month at their annual convention. The membership totals 150 men from 38 states. John H. Vanek, of Cleveland, is secretary-treasurer. The squadron was overseas from 1917 to 1919.

EARL F. WARD, veteran pilot for National Air Transport, Inc., has resigned to become chief of operations for the Interstate Air Lines, Inc., of Chicago, who have the Chicago-Atlanta air mail contract.

THE Airport Development Co., incorporated by Cleveland men, has been organized here for the purpose of constructing airports in Ohio. R. P. Cunningham is president of the company; C. H. McClelland, vice president, and W. J. Cunningham, secretary-treasurer. The company plans also to operate aerial taxi service, aerial photography, aerial advertising and student training.

AIR mail shipments through Cleveland during August showed an increase of 105 per cent over those of July. The August figures were 29,000 pounds as against 13,500 pounds for July. One shipment alone totaled 6,594 pounds. This was brought to Cleveland from Chicago by six ships of National Air Transport, Inc. The large shipment was composed of 350,000 letters sent by a motor company of Lansing, Mich. Every pilot of N. A. T., including W. L. Smith, superintendent of the eastern division, was called into service to fly the mail.

FLOYD J. LOGAN, head of the Logan Aviation Co., spoke recently before a meeting of American Eagle dealers at Kansas City. The Logan company is distributor here for the American Eagle.

KANSAS CITY NEWS

By H. H. James

MARMON MOTORS, INC., is finding its "sideline" of selling airplanes a good one. The company, three months ago, took the distributorship here of the Monocoupe, made in Moline, Ill., and the quota allowed them for the year has been sold out already. Barton Stevenson is manager of the airplane department.

CITY officials of Kansas City and St. Louis have agreed to a test suit in the state supreme court to determine the validity of airport bonds voted by the two cities recently. Kansas City voted an issue of $1,000,000 and St. Louis, a $2,000,000 issue. Because of the newness of municipally owned airports, bond houses have insisted on a supreme court decision on their legality before buying the bonds. A conference was held by officials of the two cities and steps taken to file the suits so an early decision could be reached.

TWO new air lines handling passengers and express are now in operation in and out of Kansas City. Daily service between Kansas City and Wichita, Kan., has been inaugurated by the Wichita Air Service Provision Co. The other service is between Kansas City and Omaha, Nebr., by the Interstate Air Line, a subsidiary of the Interstate Motor Stages, Inc. Both services will use the municipal airport.

KANSAS CITY claims the world's first airmen football team. Men working in the factory of the American Eagle Aircraft Corporation, have formed a football team and will seek games with professional teams of the middle west. Men on the teams are from Kentucky U., Michigan U., Illinois U., Kansas Aggies, and other colleges and universities of the middle west.

PUBLIC officials of towns and cities in Kansas who attended the annual meeting of the Kansas League of Municipalities in Kansas City, recently were guests of the Butler Manufacturing Company on airplane rides in the company plane.

A "drawing" was held each day of the convention, the winners being entitled to rides in the Butler Company plane, which is piloted by Lieut. Elmer S. Rodenbaugh.

PLANS are being made to merge the Fairfax Flying Field in Kansas City, Kans., and the Kansas City municipal airport in North Kansas City, with only the Missouri River dividing them. The Woods Brothers Corporation has purchased the Fairfax Field of 240 acres and will add other land owned by the company and enlarge the field to 800 acres. Guy E. Stanley, manager for the Woods Brothers Corporation, said his company was not entering in competition with the Kansas City municipal airport but was rather supplementing it.

The Porterfield Flying School will be moved from the old Richards Field to Fairfax Field. E. E. Porterfield, Jr., president of the school and also of the American Eagle Aircraft Corporation, indicated he also may move his factory to a site adjoining the field, as larger factory facilities soon will be necessary.

ARTHUR HARDGRAVE, president of the Kansas City Chamber of Commerce, is on his vacation—an airplane trip to California. Mr. Hardgrave is making the trip in a new type monoplane known as the Inland Sport, which was designed for him by Dewey Bonebrake, aeronautical engineer. The plane, which was recently tested at Fairfax Flying Field, is powered with a LeBlonde 5-cylinder radial engine and has a cruising speed of 95 miles per hour.

A CONVENTION of airplane dealers, selling the planes manufactured by the American Eagle Aircraft Corporation, was held in Kansas City during August. Seventy-five dealers and distributors from all sections of the United States and from Canada and Mexico attended the convention.

The dealers were shown the new 1929 models of American Eagle planes, which feature a variety of colors and color combinations, by E. E. Porterfield, Jr., president of the company, and D. H. Hollowell, sales manager.

Some of the color combinations offered in the American Eagle planes are: Varney blue and orange; canary yellow and apple green; Varney blue and canary yellow; light brown and orange; cardinal red and apple green; tree swallow green and apple green; dark blue and canary yellow; thrush brown and golden brown.

BOHN AIRCRAFT ENGINEERING DEPARTMENT

THE Bohn Aluminum and Brass Corporation has established a separate aircraft engineering department devoted exclusively to the development of airplane motor parts in order to keep pace with all branches of the rapidly expanding aircraft industry.

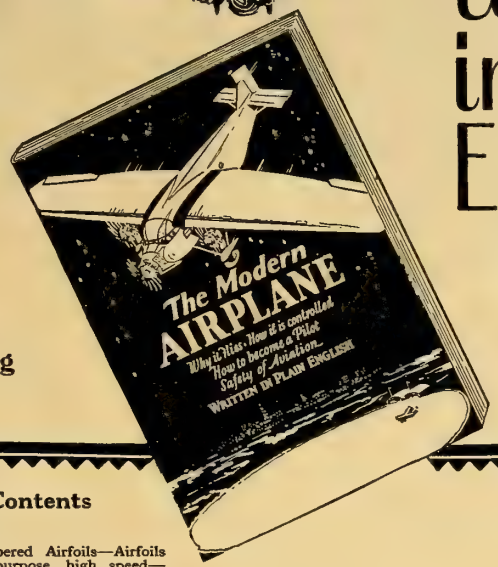
"Our engineers have been identified with this industry since its inception, hence we believe we are in a position to give authoritative advice on all matters pertaining to the development of motors and motor parts," states Chas. B. Bohn, president of this organization.

"It is our aim to encourage organizations which are building on a smaller basis. We are intensely interested in the broad development of the entire aircraft business, and we fully realize that the small operator of today is the man who needs assistance and advice of the most mature nature. This we are in a position to give.

"Bohn engineers and metallurgists are in a position to give first aid to all phases of experimental work in connection with engines, and we invite inquiries from all those who have casting problems, insofar as they relate to designs, alloys and costs."

Only $1.00

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CONCLUSION—Terminology.

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WISCONSIN AIR NEWS

By William Scollard

THE Tri-City Airways, Inc., has been formed at Wisconsin Rapids for the purpose of maintaining an airport and operating an airplane passenger and freight transport service. Signers of the articles of incorporation are John E. Alexander, Isaac P. Witter and G. D. Fritzinger. The company's airport is located two miles south of the city.

THE Watertown Aero Club, which is developing an airport at the southern limits of the city, has purchased a 3-place Pheasant biplane from the Pheasant Aircraft Co., of Memphis, Mo.

THE air field at Parkland, Superior, will be made a permanent institution and named Coolidge field as a result of the action of the Douglas county board, in session here recently.

THE Weifenbach Aeroplane Service, Inc., has been formed at Appleton. The incorporators are: Edwin A. C. Weifenbach, Philip Weifenbach and Walter P. Bogen.

THE first state fair air show held in connection with the Wisconsin State Fair, August 27 to September 1, was a decided success. An average of 25,000 persons a day attended the fair, most of whom attended the air show which was held in the Manufacturer's Building. Elling O. Weeks, president of Weeks Aircraft Corp. of Milwaukee, was in charge of the air show in coöperation with the Milwaukee Association of Commerce.

Among the companies which had exhibits at the show were the Weeks Aircraft Corporation, exhibiting a Fairchild cabin monoplane; the Holterhoff Flying Service, Inc., exhibiting an American Eagle plane; Wadhams Oil Co., a Monocoupe; Midwest Airways, Inc., a Ryan brougham, a Swallow and a Waco-10. The Department of Commerce, lighthouse service, had on display a 24-inch airway beacon, and the Post Office Department, an air mail display.

SIX airplanes equipped with propellers designed by Bertram Lord, 25, one of America's foremost aeronautical engineers and associated with the Hamilton Metal Plane Co., who died September 1 from injuries received in an auto accident on August 31st, took part in his funeral services.

ACCORDING to an announcement by Thomas F. Hamilton, president of the Hamilton Aero Manufacturing Co., the erection of a new plant to double production is planned for the near future due to the demand for the company's propellers, pontoons and other equipment.

THE recommendation of the Madison municipal airport committee that $8,000 be provided for the development of the present site as an airplane landing field was approved by the common council during the past month. A site about four miles north of Madison has been purchased by the city. The committee will spend the money in placing additional drainage in the runways and in plowing the entire field, leveling and seeding it.

RICHARD J. GOODRICH, 16-year old high school student of Madison, in coöperation with Capt. Howard A. Morey, chief pilot for the Royal Airways, Inc., has designed and developed a safety device for dual-controlled airplanes. A patent has been applied for, and the device has been highly recommended by government inspectors.

With the device made by Goodrich, the pilot merely pulls a little lever located in the front cockpit and the student's controls are disengaged, leaving the pilot with full control over the plane. It is a simple arrangement and has no gears or springs to get out of order.

RHINELANDER'S new airport was formally dedicated on September 3, the first day of the Oneida county fair. The airport board of the city consists of Frank P. Kennedy, president; Charles Grau, vice president; James M. Reed, property custodian; Dr. G. M. Perry, airport surgeon, and Aaul Abendroth, Edward Pazdernich, C. P. Williams, Charles Decanter and James M. Baker.

THE new airport at Princeton was dedicated September 9. The field covers an area of 60 acres.

MINNESOTA AIR NEWS

By W. S. Schley, Jr.

TRANSCONTINENTAL air-rail transportation service on a regular schedule was inaugurated by the Northwest Airways, Inc., when a 14-passenger Ford plane took off from the St. Paul municipal airport September 1. With Chadwick Smith at the controls, the ship completed the trip to Chicago in 2 hours 55 minutes, and on the return trip made it in 3 hours 18 minutes.

The planes leave the Twin Cities following the arrival of coast trains, and carry the passengers to Chicago in time to catch the eastbound trains that arrive in New York the next morning. On the return trip from Chicago, the planes leave at 3 p. m., and arrive at St. Paul ahead of the coast trains which leave Chicago the same morning.

Ford trimotored planes with Wasp motors are used for this new service. Hamilton all-metal planes will be used on the regular air mail schedule which is operated by the same company. Both the Ford and Hamilton planes have a maximum speed of 145 miles per hour and a cruising speed of 120 miles per hour.

THE second air-rail passenger service through the Twin Cities, established by the Universal Airlines, Inc., September 8, will be operated with the New York Central Railroad. Radios will be installed in the ships of this line which are Hamilton all-metal monoplanes with an average cruising speed of 120 miles per hour.

A FEATURE of tremendous interest at the Minnesota State Fair was the Second Annual Aircraft Show, which was visited by thousands every day of the week, September 1-8. This year the show, housed in a permanent building, presented latest models of aircraft for business and pleasure and was complete in every way.

One of the outstanding exhibits was the Lockheed Vega monoplane used by Captain Sir George Hubert Wilkins and Lieutenant Carl B. Eielson in their flight over the polar regions. Wilkins and Eielson flew their famous monoplane over the fair grounds each day, and when not in the air, the ship was on exhibition in the Aircraft Building.

Other planes of no less interest shown were: the *Aloha*, which successfully spanned the Pacific Ocean in the Dole races with Jensen at the controls; Captain Charles B.

(*Continued on next page*)



Two of the latest model Hamilton all-metal monoplanes used on the Northwest Airways' air mail route.



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Our New Buhl Airsedan



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Gary, Indiana, airport. Owned and operated by Atkinson Aviation Co.

(Minnesota Air News continued)

D. Collyer's Fairchild cabin monoplane, in which he recently made a record flight around the world; and the Texas Company's trimotored Ford piloted by Captain Frank M. Hawks.

Among the exhibitors and their various ships at the show were: North Star Aircraft Corporation, Liberty Bell plane; Roth-Downs Airways, Travel Air plane; Mohawk Aircraft Corporation, Mohawk plane; Northwest Airways, mail routes exhibit, Stinson-Detroiter mail plane; Northrop Airplane Company, Eagle plane; Kari-Kleen Airplane Company, plane; Whites Aircraft Company, monoplane; Northern Airlines, Inc., Stinson monoplane; the 109th Aero Squadron had four planes on exhibit. A large glider was also on exhibition.

A boys' and girls' airplane contest was held in conjunction with the Aircraft Show. The contest was in charge of G. J. Bergup.

MORE than 10,000 persons visited the Elk River air derby which took place recently. An air parade with nearly twenty ships flying in formation, an air circus and parachute jumps, aircraft show, and air derby races were presented. Gene Shank of the Twin Cities put on an exhibition of stunt flying before the races began which was the feature of the derby. "Thunder" Johnson, holder of the world's barrel-roll record, demonstrated some of the "rolls".

UNIVERSAL AIRLINES, which operates a Twin Cities-Chicago passenger schedule, flew at 75 per cent of its total capacity during the first month of its operation. The line opened August 1, and has maintained 98 per cent efficiency.

A CIRCULAR concrete marker, 100 feet in diameter, has been installed in the center of the Wold-Chamberlain municipal airport, Minneapolis, which is visible from the air at a great height.

THE United States Navy has furnished aeronautical equipment to the mechanical engineering department of the University of Minnesota for use in teaching students who have enrolled in the aeronautical course offered this fall. Charles Boehnlein, professor of mechanics, who teaches the aeronautics course, has stated that a separate department of aeronautics has been provided.

A POWERFUL beacon light visible for 40 miles has been installed at Rochester on the Mayo clinic building. The beacon, using a 1,000-watt lamp, makes a complete revolution every thirty seconds. Pilots have been asked to check the light from different points while on their night flights.

CECIL WILLIAMS, of the aeronautical division of the William B. Joyce Insurance Company, has announced that the lowest passenger liability insurance rates given any flying organization has been made for the Northwest Airways. The fact that they have operated for two years without accident is responsible for this low rate. The company's planes have flown 500,000 miles without a mishap.

HASSELL AND CRAMER

WHEN the September issue of AERO DIGEST went to press, the Illinois to Sweden fliers, Bert R. J. Hassell and Parker D. Cramer, had not been heard from after having taken off from Cochrane, Ontario, on August 18 on the second leg of their flight. But on September 2 Hassell and Cramer were rescued by members of the Michigan University Greenland Expedition in response to smoke they had sent up from the south side of Sondre Stromfjord.

In flying from Ontario to Mount Evans, Greenland, the fliers departed from their intended course because of storms and a dense fog. When they reached the Greenland coast, they were so far south of Mount Evans that they were unable to fly there before their fuel supply was exhausted. However, they made a perfect landing on the ice after which they set out on foot for Mount Evans. Their trek across the ice wastes lasted two weeks, at the end of which time their signals were seen by Prof. W. H. Hobbs and his associates of the Michigan University expedition.

Later Hassell and Cramer narrowly escaped death when the motor boat in which they and the Hobbs party were proceeding down the Greenland coast struck a rock and sank.

Both fliers want to try another flight over the same route. They are convinced that with their now greater knowledge of Greenland and with a plane performing as efficiently as did the *Greater Rockford* over the 2,400 mile stretch, they can achieve their goal.

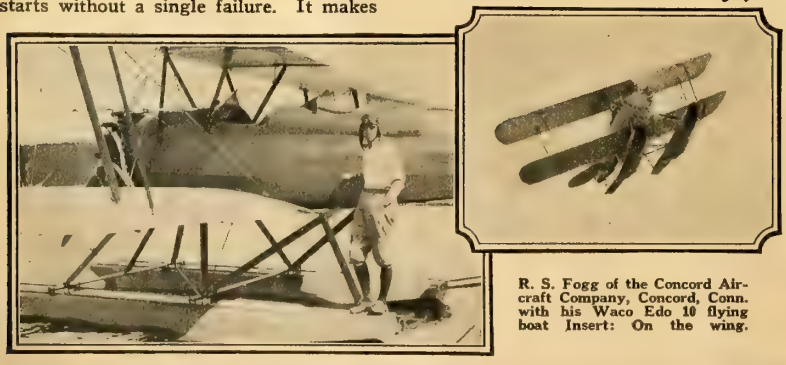
"I would not be without the HEYWOOD STARTER"—

Mr. R. S. Fogg of the Concord Aircraft Co. has been flying for 10 years, and was an army instructor. He has been operating flying boats over Lake Winnepesaukee for five years. As a dealer in aircraft, he specifies Heywood Starters on all motors he sells. He has carried over 15,000 people without a mishap.

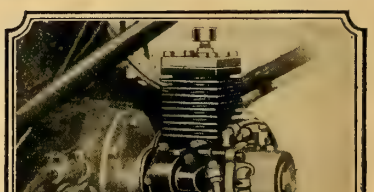
"PERSONALLY, I would no more be without the "Heywood" on my ship than I would be without a starter on my car. This season, I bought a Waco-Edo 10 with a Wright J 5 motor for use in my short flight passenger service.

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"I cannot too highly recommend the Heywood Starter for use in all modern aircraft." *R. S. Fogg*



R. S. Fogg of the Concord Aircraft Company, Concord, Conn. with his Waco Edo 10 flying boat Insert: On the wing.



Close-up of Heywood High-Pressure Injection Starter

Instant response and efficiency, regardless of weather conditions, has earned for the Heywood Starter the stamp of approval of leading aircraft pilots and manufacturers.

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The new AVRO-AVIAN, for all-American distribution, is equipped with the new Mark III CIRRUS 4-cylinder-in-line, air-cooled engine, 95 H.P., an improved under-carriage, folding wings and —

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WICHITA AIR NEWS

By Edwin W. Pryor

DAILY air service between Kansas City, Mo., and Wichita started in September, and will be given a 30-day trial, it is announced by Dan Sauder, president of the Wichita Air Service Provision Company and of the Southern Kansas Stage lines. A Travel Air monoplane will be used during the 30-day test, leaving Wichita each morning at 7:30 o'clock, and taking off from Kansas City at 3:30 or 4 p. m.

Charles Lander, operations manager of the WASP, and Ted Moffitt, pilot, will alternate at the controls. Fare charged will be $17.50. Kansas City headquarters will be at Sweeney airport.

LEONARD JURDEN, of Los Angeles, has been appointed resident inspector for the Bureau of Aeronautics, Department of Commerce, in Wichita. C. A. Braukman, who was here, has been made supervisor of the five-state district, with headquarters in Kansas City.

WITH the Supreme Propeller Company of Wichita receiving more orders than it can fill, a new propeller lathe has been installed, doubling capacity of the plant. With the new lathe, the factory force of 25 will turn out 10 props a day, instead of 5 as heretofore.

MRS. ROSCOE VAUGHAN has been elected president of the recently organized Wichita Women's Aeronautical association. Mrs. Wilbur Neeley was named vice president and chairman of the membership committee; Miss Olive Anne Mellor, secretary; Mrs. Lloyd Stearman, treasurer, and Mrs. Victor Roose, chairman of the social entertainment committee.

"DRIVERLESS planes", similar to "driverless rent autos", are offered by the WASP company to pilots holding licenses and known to officials of the company. The rental is reasonable.

MAJOR W. N. BREINGAN, factory inspector for the Bureau of Aeronautics, Department of Commerce, has been ordered to the Eaglerock factory at Colorado Springs, Colo., to install the factory system of plane inspection there. Oliver Rosto replaces him in Wichita. Major Breingan, better known as "Scotty", installed the system in the Travel Air, Swallow, and Stearman factories here.

OFFICIAL block tests of the Quick motor—a converted LeRhone rotary—started in Washington, D. C. the week of September 10. C. Erie Quick, who holds the conversion patents, went to Washington for the test. The company has erected a factory here on the new airport, and will be in active production in a few days.

"AIRCO" is the newest company on the airport in Wichita. The firm has built a large hangar and entered the repair field. Incorporators are Dale Myers, Joe Thomas, and O. W. Dakin. They plan to give instruction, and do passenger work as well as repair jobs.

THE Stearman Company has started working on the first model of a small three-passenger cabin biplane to be powered with the new Wright seven-cylinder motor, to be on the market next spring.

AMOS G. PAYNE, designer for Swallow Airplane Company, has resigned to accept the managership of a new plane factory in St. Louis.

Wichita Divisional Meeting of the Aeronautical Chamber of Commerce

AT a meeting in Wichita, Kansas, August 21-22, the South Central Division became the first to organize under the new expansion program of the Aeronautical Chamber of Commerce on the basis of specialized and geographical divisions. The members of this division heartily endorsed the new program and pledged themselves to assist in the organization work.

Among the more salient matters which arose at the meeting was the suggestion that a department be created within the Aeronautical Chamber of Commerce to study legal air problems. Because precedent for aerial law is so uncertain and because problems requiring legal interpretation are becoming constantly more numerous, every legal decision is of vital importance to the entire industry.

Another important discussion before the meeting related to flying schools and the promotion of flying. After several plans had been discussed, this subject was referred to the School Committee of the Chamber for further investigation.

Walter Beech, vice president of the Chamber of the South Central Division, and president of the Travel Air Manufacturing Co., issued the call for the meeting. J. Don Alexander, president of the Alexander Airplane Co. presided. Others participating were: Clyde V. Cessna, president, and Meade Hargiss, of the Cessna Airplane Co.; Victor Roos, president of the Swallow Airplane Co.; Lloyd Stearman, president of the Stearman Aircraft Co.; Mac Short, vice president of the Stearman Aircraft Co.; Arch Merriman, oil producer of Wichita; Charles Parker, of the Spartan Aircraft Co.; O. C. Herndon and Clem Condon, of the Skelly Oil Co., and Spartan Aircraft Co.; Wilbur Neeley, oil operator of Wichita; E. D. Sommers, field representative of the Gates Rubber Co.; F. O. Carr, cashier of the First National Bank of Wichita; George H. Hamilton, vice president of the Fourth National Bank, Wichita; Walter Anderson, Swift Airplane Co.; Major L. D. Gardner, president, Luther K. Bell, secretary and John Harding, Jr., of the Aeronautical Chamber of Commerce.

IN their flight across the continent to Los Angeles, where they attended the Aeronautical Exposition, Mrs. W. L. Curtis of Bradford, Pa., and Mrs. A. E. Conant of New York City visited the Travel Air factory during their stop-over in Wichita. They were the guests at lunch of Olive Ann Mellor, office manager for Travel Air. In the afternoon, the party took off on its next hop, to Fort Worth.

Joe Bennett piloted the plane which is an open cockpit Travel Air stock model, owned by William H. Emery, Jr., of Bradford, Pa. The plane is unique in that the front cockpit is outfitted with the same kind of instrument board as the rear seat. In addition to the standard instruments Mr. Emery's ship has an electric starter, landing lights, parachute flares, navigation lights, 105-gallon fuel capacity, fuel gauge, wheel brakes, dash lights in both cockpits, altimeter in both cockpits, dash lights in both cockpits, bank and turn indicator, clocks in both cockpits, compass, rate of climb indicator, air speed meter in both cockpits, heaters in both cockpits.

About the only thing Emery seems to have missed is a cigar lighter—"But," said he, "I don't smoke."

INDIANA AIR NEWS

New Terre Haute Field

DRESSER FIELD, Terre Haute, Ind., operated by the Terre Haute Airways, Inc., is situated at the south edge of the city, just across from the Municipal Golf Course.

At present there are six ships operating from the field, three of which belong to Terre Haute Airways who are engaged in student instruction and passenger flying. Waco-10 planes are used by the company and arrangements have been made for the sale of these planes locally by this company.

The field, in charge of Harry T. Musick, is situated just two miles south of the post office on state road No. 41. Pilots can easily locate it by the Davis Company's greenhouses just northeast of the field.

The new Terre Haute House hotel is cooperating with the Terre Haute Airways by rendering free taxi service from the field to their hotel for any passengers who stop over.

Dresser Field was used as a control point for Class A planes in the Transcontinental Air Races and as an overnight control stop for Class B and C planes. A complete repair shop and service of all kinds is available.

SOUTH BEND AIR MEET

THE St. Joseph Valley Aviation Club staged its second air meet September 15 and 16 at the South Bend municipal airport. On the second day of the meet more than 30,000 persons gathered to witness the flying of 47 (registered number) planes. Races and a balloon straffing contest were included among the events. The free-for-all race was won by M. V. Aavang in a Swallow biplane powered with a Whirlwind engine. Arthur Davis, flying a Waco, was second.

Russ Moore made a delayed parachute drop from an altitude of 6,000 feet. Another interesting feature of the meet was the formation flying by army aviators from Wright field, Dayton, Ohio.

A. W. Snyder headed the members of the aviation club in charge of the meet.

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Say you saw it in AERO DIGEST

CINCINNATI AIR RACE

By Charles E. Planck

A NEW air event and a new trophy took their places on the aviation calendar of America, September 23, when the three prize winners of the Cincinnati Air Race of 1928 were named and awarded their prize money and trophies at the Sinton Hotel, Cincinnati.

A new name in the aviation lexicon appeared at the same time, and a new record was hung up for speed in staging such a race. The name is Airace, and the record is 15 days.

Robert A. Dake, flying an American Moth with a Warner motor, was the winner in Class A. His prize was $2,000. Charles W. "Speed" Holman was first in Class B and he also won $2,000. Art Goebel, the only one to finish in the non-stop, won $3,000. Each of these winners received a replica of the Henry C. Yeiser, Jr., trophy, and a leg on the major trophy. Three victories in the race give permanent possession of the major trophy which is of solid gold and valued at $5,000.

The race was arranged in 15 days by John Paul Riddle, general manager of the Embry-Riddle Co., T. Higbee Embry and John W. Pattison. Henry C. Yeiser, president of the Metal Aircraft Co., financed the race.

Col. C. O. Sherrill, City Manager of Cincinnati, was general chairman of the committee; Riddle, general manager; Pattison, treasurer; Embry, chairman of the reception committee. Charles E. Planck of the Embry-Riddle Company managed the Cincinnati office and handled the publicity.

Despite the speed with which the race was conceived, planned and staged, there was unanimous approval of its success by participants, Cincinnati spectators and aviation officials generally. A crowd of 50,000 people at Lunken Airport Saturday and Sunday, September 22 and 23, enjoyed two days of uninterrupted entertainment, not marred by the slightest accident.

Class A racers took off from Mines Field, Los Angeles, September 19, after waiting for a heavy fog to lift. They immediately ran into unfavorable flying conditions and only a few reached the first night control stop, El Paso, that night. From there they straggled across the route, and finally nine of the 19 reached Lunken airport, one of them just in time to get the performance prize of $100, given to every entrant except prize winners who reached the goal before sundown of September 23.

Only two of the eight entrants in Class B reached Lunken Airport. Three of these entrants changed their minds at the last minute and did not enter.

Following are the official figures on all successful contestants:

CLASS A:

First, Robert A. Dake, American Moth, Warner engine, 90.30 miles per hour, prize, $2,000.

Second, George W. Hopkins, Stinson, Jr., Warner, 86.30 m.p.h., prize $800.

Third, Theodore K. Kenyon, Challenger, Warner, 86.00 m.p.h., prize $400.

Fourth, S. J. Whittman, Pheasant, OX5, 80.72 m.p.h., prize $200.

Fifth, J. Shelly Charles, Eaglerock, OX5, 75.74 m.p.h., prize $150.

Alfred Stanley and Ralph Haynes in an OX5 Waco, Dick Myhres in a Simplex monoplane with a Kinner engine, and Samuel Turner in a Berliner monoplane with an OX5 also finished, and each received the $100 performance prize.

CLASS B:

Charles W. (Speed) Holman, Laird, Whirlwind, 120.40 m.p.h., prize $2,000.

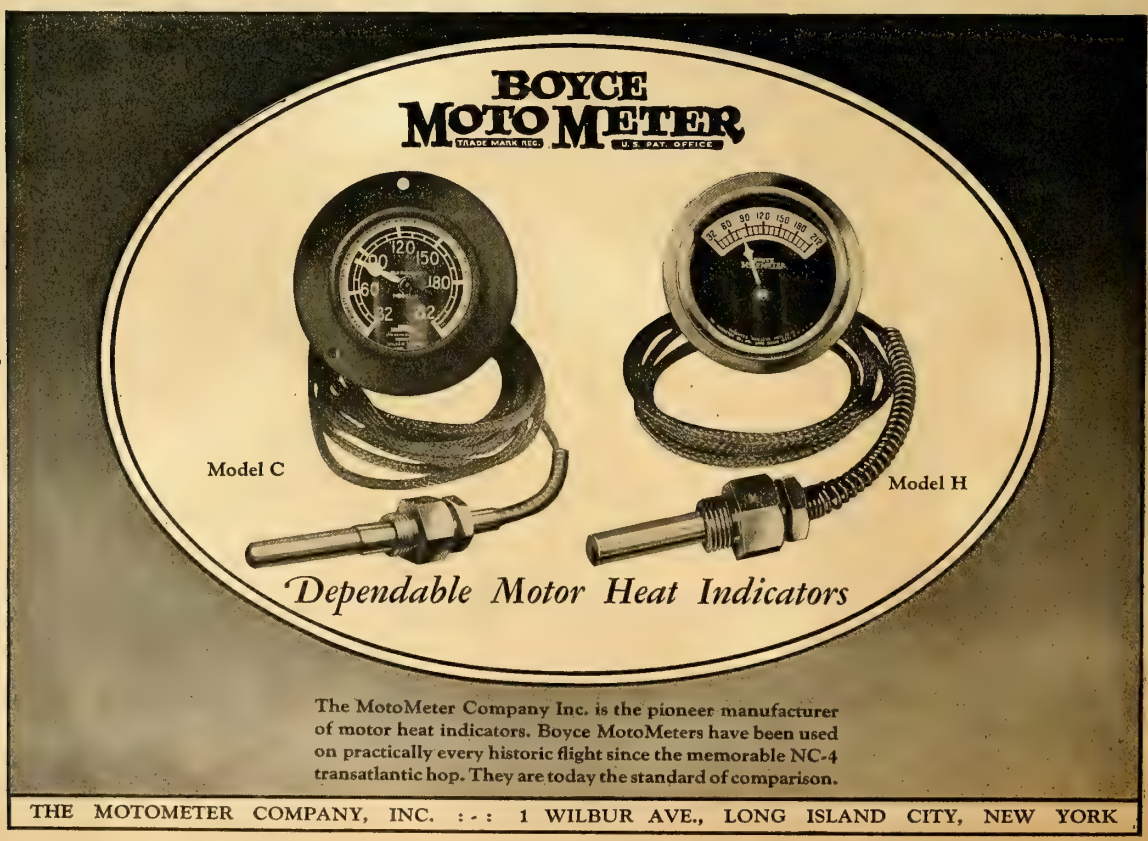
E. E. Ballough, Laird, Whirlwind, 83.12 m.p.h., prize $900.

NON-STOP:

Art Goebel and Harry L. Tucker, Lockheed Vega, Wasp, 129.48 m.p.h.

Additional prizes offered the racers totalled $3,000. This sum was given by the Kendall Oil Refining Company of Bradford, Pa., to be divided among the winners in Class A and Class B who used Kendall oil exclusively throughout the race. In each class, the first place pilot received $500, second $400, third $300, fourth $200, and fifth $100. The Pine Bluff committee gave articles of the famous Niolak pottery as leg prizes to winners arriving there from Fort Worth.

Part of the entertainment at the field consisted of a multiple parachute jump by four students of the Embry-Riddle Flying school, parachute section. They are Rex Harker, East Liverpool, Ohio; Harold Sanders, East Liberty, Indiana; Albert Schultz, Cleveland, Ohio, and Ellis Jones, Cave City, Ky. They were piloted in a Fairchild plane by John Paul Riddle, and all unloaded within the space of 7 seconds.



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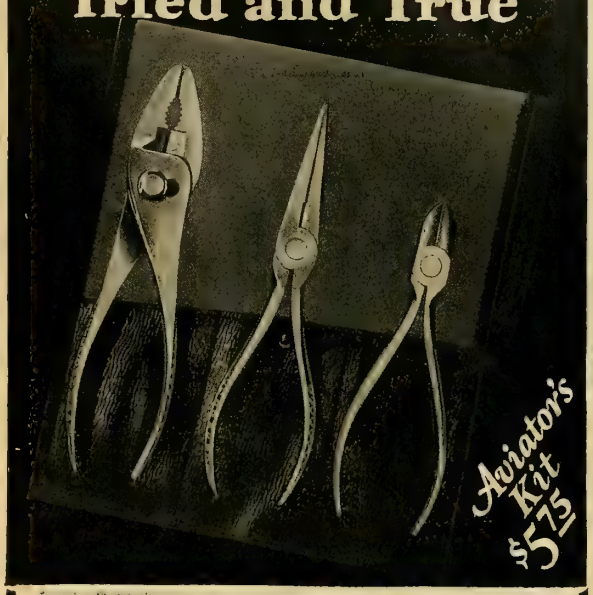
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EVANS GLIDER CLUBS

DEFINITE organization of the Evans Glider Clubs of America has been concluded, and organization of local subsidiary clubs is under way.

The new officers are: Edward S. Evans, permanent honorary president and present acting president; Prof. Alexander Klemin of the Guggenheim Fund school at New York University, first vice president; Thomas G. Lanphier, U. S. Army (retired), second vice president; Robert O. Lord, treasurer; and Captain Eddie V. Rickenbacker, secretary. Mr. Karl S. Betts has charge of publicity.

The personnel of the board of directors is as follows: Col. L. H. Brittin, manager of Northwest Airways, Inc.; Harvey Campbell, vice president and secretary, Detroit Board of Commerce; Harold H. Emmons, attorney of Detroit; Carl B. Fritsche; Lieut. Jack Harding, Aeronautical Chamber of Commerce; Col. Paul Henderson, general manager of National Air Transport, Inc.; Charles F. Kettering, head of the General Motors Research Corporation; Major Reed Landis, second American ace during the World War; J. L. Maddux, Maddux Airlines; Wm. B. Mayo, chief engineer, Ford Motor Company; Wm. E. Metzger; Admiral William A. Moffett, Chief of Bureau of Aeronautics; Earl S. Osborn, publisher of Aviation; Ward T. Van Orman; Major William B. Robertson, Curtiss-Robertson Airplane Mfg. Co.; Porter Adams, president, N. A. A.; Carl F. Schory, secretary of contest committee, N. A. A.; William Scripps, Jr., *Detroit News;* B. Russell Shaw, airport engineer; Edward A. Stinson, manufacturer and pilot; Frank A. Tichenor, publisher of AERO DIGEST; A. V. Verville, designer; and Capt. L. M. Woolson, designer.

SAME OLD BUBBLE TO ME

(*Continued from page* 686)

Defense, with special reference to its ability or lack of ability to remain afloat under determined aerial attack.

With Commander Webster's conclusion that the ability of a battleship to remain afloat under attack depends upon the amount of destructive force which can be exerted against it, I am in accord. But with his conclusion that the available evidence does not support my contention that the battleship cannot survive, I do not agree. I believe that *our present airplanes,* properly handled, properly supported by surface craft, *are capable today* of bringing to the battleship that destructive force which *inevitably must send the battleship to the bottom.*

NEW BELLAH SERIES

Aero Digest is very happy to announce that James Warner Bellah will contribute a series of articles on aeronautical development—both civil and military—in Europe and Asia.

"The London Test Raids," published in this issue, is the first of this important series.

Mr. Bellah has spent over a year in Europe and Asiatic countries, getting the facts. They will be told as he found them without embellishment.

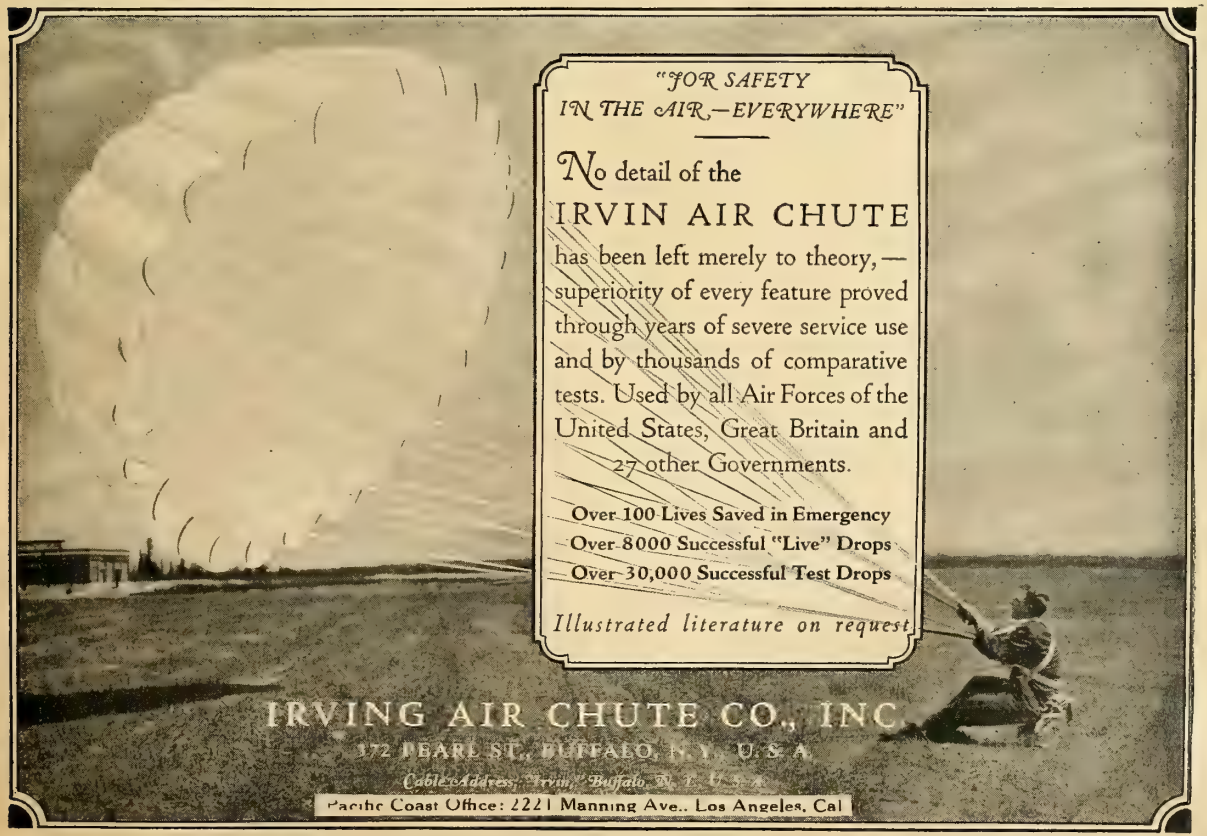
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NOTICE

PROPOSALS FOR PURSUIT AIRPLANES

Office, Contracting Officer, Wright Field, Dayton, Ohio. Sealed proposals will be received here until 2:00 P. M., March 7, 1929, Eastern Standard Time, for the development and submission of sample pursuit airplane, and furnishing proposed airplane in quantities of one, two, three, five, ten, twenty-five, fifty or one hundred, at Government's option. Further information on application.

NORTH DAKOTA NEWS

By A. E. Riggle

THE Fargo-Minneapolis air line, operated by the Mid-Plane Sales and Transit Company, under the Universal Air Lines System, has been changed from a daily to a tri-weekly schedule. The division headquarters have been removed from Fargo to Minneapolis. Runs are made on Mondays, Wednesdays and Fridays, the plane leaving Minneapolis at 8:30 a. m., arriving at Fargo at 11 a. m., and leaving for Minneapolis on the return trip at 2 p. m.

THE School of Science at Wahpeton, a state institution, plans to offer a course in aviation this fall. This is the first complete course to be given by any North Dakota educational association. Arthur Sampson and William Freeman, veteran fliers, will teach the course.

THE Mott airport will be dedicated with an aerial meet October 2, 3 and 4. The port consists of 120 acres of land and is financed and operated by an organized group of citizens, the Air Service Associates, Inc.

GUGGENHEIM FOG FLYING LABORATORY

THE Daniel Guggenheim Fund for the Promotion of Aeronautics will establish a full-flight laboratory on a section of an established airway, where fog flying under regular operating conditions can be studied. An experienced pilot, with engineering and scientific training, will have charge of the laboratory, and Colonel Charles A. Lindbergh will act as a special adviser to the project.

This laboratory is in natural sequence to the informal committee organized by the Fund in 1926 to study fog flying. This committee consisted of the Assistant Secretaries for Aeronautics in the Departments of War, Navy and Commerce, Edward P. Warner, F. Trubee Davison and William B. MacCracken, respectively, and Harry F. Guggenheim.

All the devices thus far employed in efforts to solve the fog problem will be tested and reported on by the Fund, and the results thereof will furnish the basis for further study and experiment.

INTERCOLLEGIATE AIR CONFERENCE

COLLEGE aero clubs throughout the United States will be represented at the Intercollegiate Aviation Conference to be held at Yale University, New Haven, Connecticut, October 19-20, under the joint auspices of National Aeronautic Association and Yale Aeronautical Society. Besides the official representatives of the Universities, the aeronautical industry will send men interested in the development of college aviation.

With the purpose of considering the whole problem of collegiate participation in aeronautics, the program of the conference will afford discussions concerning the organization of aero clubs under the recognition and coöperation of universities, the financing of such clubs, the activities of the local clubs, and intercollegiate aviation activities including air races, glider contests, and research competitions.

The Yale Aeronautical Society will appreciate suggestions for additions to the program. Announcements of the conference will be mailed to all college aero clubs and university secretaries in the early fall.

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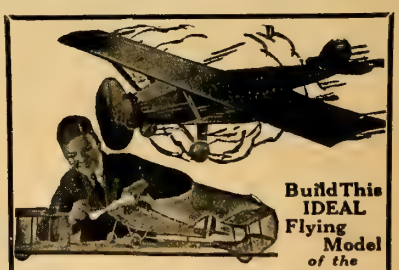
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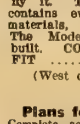


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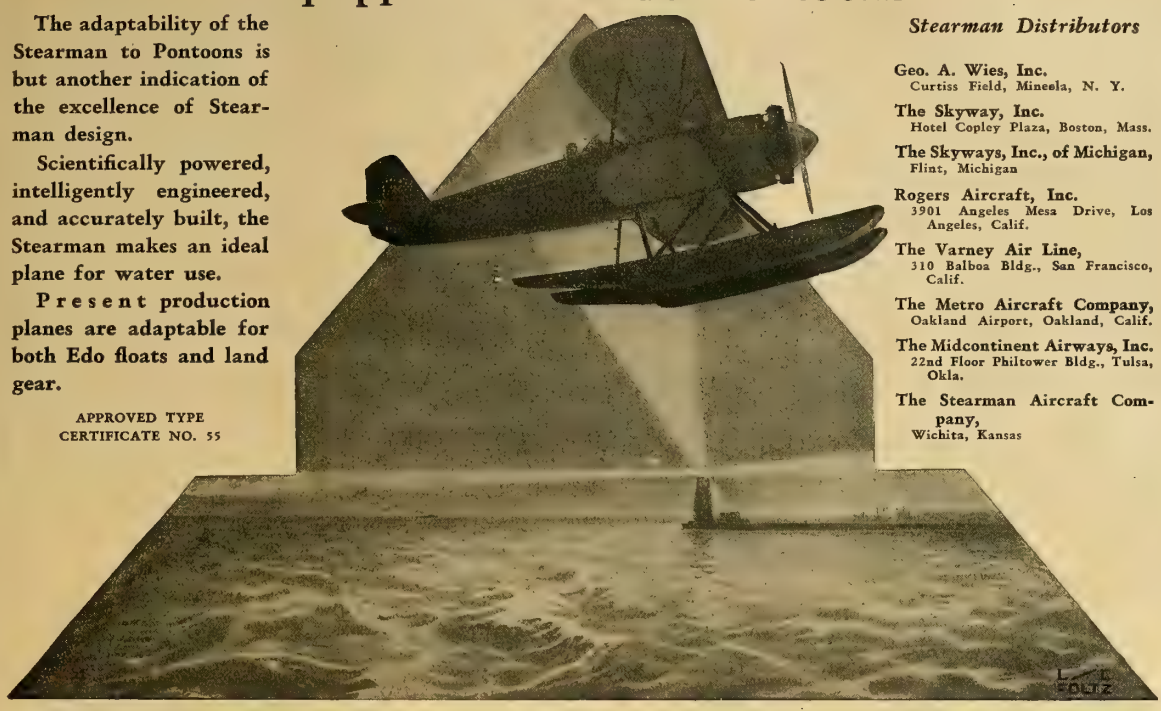
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AIRPORTS ORGANIZE AS NATIONAL UNIT

AT a conference at the New York headquarters of the Aeronautical Chamber of Commerce, August 29, an Airport Section was organized for the purpose of uniting the commercial airports of the United States to bring about a standardization of rules and service. A National Committee was formed to arrange further organization throughout the country.

Major John Berry, manager of Cleveland Airport, was elected chairman, and Clarence A. Chamberlin was elected vice chairman of the committee. Other members of the committee are: W. E. LaFollette, manager, Los Angeles Municipal Airport; F. B. Hegardt, manager, Oakland Municipal Airport; J. A. Casey, manager, Chicago Municipal Airport; Francis J. Geng, manager, St. Paul Municipal Airport; Major A. B. Lambert, manager, St. Louis Municipal Airport; R. S. Saltus, manager, Philadelphia Municipal Airport; Gardner Fisk, chairman, Boston Airport Committee; W. B. Hartsfield, manager, Atlanta Municipal Airport; H. Finch, manager, Salt Lake City Municipal Airport; Stedman Hanks, president, American Airports Corp.; W. J. Austin, president, Austin Company, Cleveland; C. S. (Casey) Jones, Curtiss Flying Field Service; W. W. Kellett of the B. B. T. Corporation; and Howard C. Knotts, Springfield, Ill.

A subsequent meeting of the Airport Section was held in Los Angeles during the air races in September, and another will be held in Chicago in December during the International Aeronautical Exposition.

MERRILL AND RONNE

MAZEL M. (MERRY) MERRILL, operations manager of Curtiss Flying Service and Edwin Ronne, manager of the Buffalo Airport, were killed August 28 when the Curtiss Falcon plane they were flying crashed on a wooded knoll during a dense fog. Merrill and Ronne were en route from Buffalo to Curtiss Field, L. I., when the accident occurred in a sparsely inhabited region near Port Jervis, N. Y. The wrecked plane and its occupants were found as the result of a widespread aerial search.

In the absence of definite clues as to the manner in which the accident occurred, it is believed that the men were suddenly enveloped in the fog which hid the obstructing knoll and that they crashed before they were aware of the hidden obstruction.

Both Merrill and Ronne were widely known in aviation circles throughout the country. Merrill came to Curtiss Field in 1925 after a period of aerial barnstorming in the west after the war. He was not only a competent pilot but a successful field manager. His quiet and unassuming manner won him many friends.

COM. HUNSAKER JOINS GOODYEAR-ZEPPELIN

COMMANDER J. C. HUNSAKER, formerly of the United States Navy, recently assumed his new duties as vice president of the Goodyear-Zeppelin Corporation. He will engage in research and the development of commercial airship relations for that concern.

A graduate of both the United States Naval Academy and Massachusetts Institute of Technology, Hunsaker has been director of aeronautical engineering and research at M. I. T., research engineer for Bell Telephone Laboratories, head of the aircraft division of the Bureau of Construction and Repair of the Navy Department, and chief of the design division of the Bureau of Aeronautics.

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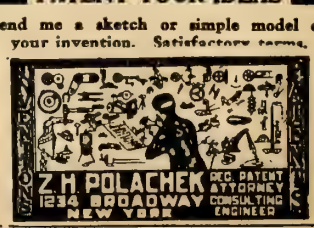
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FOREIGN AERONAUTICAL NEWS IN BRIEF

Compiled from the foreign aeronautical press, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

CANADA

Canadian Air News

TORONTO AIR SHOW

By James Montagnes

WITH the opening of the Canadian National Exhibition on August 24, the First International Air Show at Toronto opened its doors to the public. American, English and Canadian planes were on view but, as at Montreal, the majority of planes and accessories were of English make.

Two new Canadian air mail routes were inaugurated at the same time as the opening of the Air Show. A Buhl Airsedan flew with the mail from Windsor, stopping at London and Hamilton on the way. From Quebec came a Loening amphibian, which dropped some of its mail at Ottawa. The planes met on the waterfront of the exhibition at Toronto early in the afternoon, leaving their mail and taking on a new consignment. Then the Windsor plane flew to Quebec, and the Loening amphibian continued its westward flight to Windsor. Express was also carried by these two planes, Canadian Pacific Express cars waiting to rush the parcels from the waterfront.

The show was held in the old Machinery Building, pending a new aircraft building. About a dozen planes were represented, due to lack of space. A Moth plane, equipped with the new Gipsy Moth 85 h.p. engine, attracted the most attention. The Avro Avian, powered with a Cirrus 80 h.p. engine, was another that attracted interest.

The Swallow, Travel Air and Monocoupe were among the American planes represented. A Canadian-built Fairchild seaplane was featured by the Canadian Vickers Company. They also showed a Vedette flying boat of the pusher type, equipped with a 220 h.p. Wright Whirlwind engine.

The Armstrong-Siddeley engines, the Lynx rated at 225 horsepower, Genet at 85 and Jaguar at 425, were among the English motors at the show.

In conjunction with the Air Show a squadron of American aviators from Selfridge Field, under command of Lieut.-Col. C. H. Danforth, visited Toronto on September 4th. Seventeen Curtiss Hawk pursuit planes, a reconnaissance plane, and a transport machine flew to Toronto from Detroit where they were met by twenty Toronto planes flying in formation under Carter Guest, of the Toronto Flying Club. In the evening a banquet was tendered the visiting airmen.

THE Atlantic and Pacific Airway Company, Ltd. has been granted an Ontario charter as an aerial transport company, with headquarters at Sarnia.

Another new concern is the Harding Aircraft Co. of Toronto, headed by Dave Harding, a prominent Queen's University football player of some years ago. They will manufacture planes on the design of Commander Harding, who, until resigning to go into commercial aviation, has been flying instructor at Camp Borden. He will be the first to start an airport and aircraft factory on Toronto's waterfront.

Western Canada Air News

By C. D. McCabe

THE Winnipeg Flying Club staged its second aerial circus August 8th at Stevenson Field. Planes from the Saskatoon, Moose Jaw, Regina Flying Clubs were entered, as well as a number of local ships by the Winnipeg Club, Western Canada Airways, Holley Aviation Company and the Royal Air Force. The judges were Squadron Leader L. F. Stevenson of the R. C. A. F., Al Cheesman of N. A. M. E., and W. C. McCurdy of the *Winnipeg Tribune* and Duke Schiller of Montreal. The feature, a twenty-five mile race, was won by Jeffry of the Western Canada Airways.

THE Winnipeg Flying Club has just purchased a new Moth plane from the De Havilland Company at Toronto. Instructor De Bliquay and Partridge will leave shortly to fly the plane home. Officers of the club are: Hon. president, D. C. Coleman; president, J. A. Sully; vice president, H. P. Crabb. Executive committee: Dr. R. E. Alleyn, T. C. Anderson, N. A. Beketov, C. A. Gallagher, R. H. Parkhill, E. A. Nanton, W. A. Straith, and A. H. Bill.

THE first amphibian to be seen in Winnipeg was a Loening machine flown in August 18th by Al Cheesman of the Northern Aerial Mineral Exploration Company, accompanied by Duke Schiller. The plane went on to Le Pas and there picked up a party of prospectors, taking them on to Fort Churchill on Hudson Bay.

News from Canada

By C. P. C. Downman

BLAZING a new air trail and carrying the first air mail across Canada, Squadron Leader A. Earle Godfrey has completed the last leg of the first direct air mail flight across Canada. His flying time from Ottawa to Vancouver, 3,300 miles, was 32 hours.

THE first air mail service west of Winnipeg has been established from The Pas, Man., to Cold Lake mining area. Formerly mail was taken to and from Cold Lake at infrequent intervals, greatly handicapping the work of the mine recording office established there last April. The new post office will be named Kississing, the Cree word for "Cold".

Border Cities News

By Gerald M. Brown

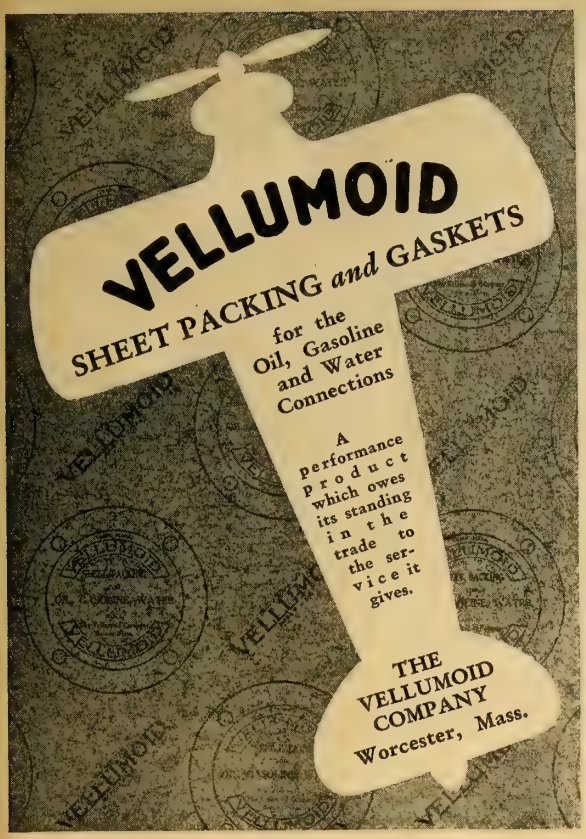
CANADA'S newest flying field was placed in operation, Canada's first air race was held, and the first international air races from a Canadian to an American city got under way, as the features of a two-day aviation meet at Windsor's new field, Walker Airport, on September 8 and 9. Twenty thousand people, residents of Windsor, Ontario, and its big neighbor, Detroit, attended the meet.

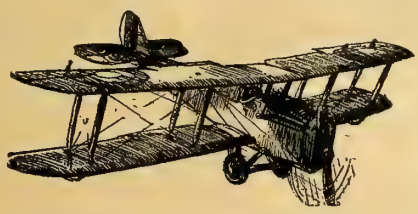
In the Dominion's first air race, a 100-mile sprint about Essex County, of which Windsor is the shire town, nine planes flew, although only seven of them were in actual competition for the prizes,—possession of the Border Cities Star trophy for one year, and three cash awards aggregating $800. The winner was Capt. F. G. M. Sparks, representing the Montreal Light Airplane Club, flying a DeHavilland Moth; time, 53 minutes, 55 seconds.

In addition to the winner, the fliers, in the order of their positions at the end of the race, were: W. J. Sanderson, pilot-instructor of the London, Ont., Flying Club, whose Moth carried him in second; Lieut. Kenneth E. Whyte, of Grimsby, Ont., flying a Moth and representing the Hamilton Aero Club, and Norman A. Thomson, of Chatham, Ont., piloting a Lincoln-Page, tied for third place; Lieut. R. H. Soundy, instructor of the Border Cities Aero Club, Windsor, flying a club Moth; R. Carter Guest and E. C. Burton, instructors of the Toronto Flying Club, operating Moths which took fifth and sixth places respectively. Two other ships, a second of Border Cities Aero Club, piloted by Capt. G. S. Abbott, of the Canadian national defence department, at Ottawa, and an American Eagle, flown by H. H. Hammil, Detroit, completed the course, but were not competing for the prize money.

Five planes lined up for the start of the International air derby, early the next morning, from Windsor to Mines Field, Los Angeles—a Moth, Lieut. Kenneth E. Whyte, pilot, and Harry R. Campbell, Grimsby, Ont., passenger; Stinson-Detroiter, Charles V. Towns, Windsor, pilot, and Eddie Stinson and two Detroit men, passengers; Waco-10, William Drury, London, pilot, and M. E. Oliphant, Ann Arbor, Mich., passenger; Martin bomber, S. T. Stanton, pilot, and E. V. Hemple, passenger, both of Windsor; Moth, Capt. G. S. Abbott, Ottawa, pilot, and Frank Mollard, Windsor, passenger.

The first day's flight, as far as Omaha, Nebraska, really eliminated all but Whyte and Drury. Drury won the race and $5,500, as well as nearly $1,000 offered in lap prizes by the control cities at which the planes stopped on their way across the continent. Whyte and Campbell were awarded second money of $2,500.





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TEMPELHOF—GERMANY'S PREMIER AIRPORT

By Edwin P. A. Heinze

ON the former exercise ground at Tempelhof, Germany's capital has created one of the finest airports in Europe. It is situated only a few minutes' drive from the center of Berlin.

"Tempelhofer Field," as it is called in Germany, is over two miles long from east to west and about a mile deep. In the east and west it is flanked by densely populated districts and in the south by a railway line, immediately behind which is the suburb of Tempelhof. It is cut in two from north to south by a main road. The western half has been settled with a garden city, and the eastern half has been reserved for the airport and recreation grounds. It is nearly rectangular in shape, has a length from east to west of 4,595 feet and a depth from north to south of 3,610 feet. The whole area has been graded and sown with grass. Its northern boundary is formed by a road with a park and a cemetery beyond. To the east and west the flying field has flat grounds extending for about half a mile to where the buildings start, and to the south is a belt of waste land which will eventually be absorbed into the airport.

This airport within a city brings special safety problems to solve. The half mile belt of flat country to the east and west of the port, which in the west is wholly devoid of trees, constitutes an ample margin of safety for gliding. Beyond this there are no high buildings, with the exception of a tall monument on an artificial hill northwest of the port, a church spire northeast and two rather tall chimney stacks down south. In the north of the airport, beyond the park and cemetery, the ground, which otherwise for miles all around is almost as level as a billiard table, drops away considerably so that the old city of Berlin with its numerous spires and towers lies several metres lower than the port.

The area covered by the flying field is surrounded by a wire mesh fence, made visible by special white and red colored shields and by a line of short shrubs. The administration buildings and hangars are along the northern boundary, adjacent to the road which forms the principal approach to the airport. It also has an underground station and a tram line, and further approaches are under construction.

The main administration building, which is this year being considerably extended, is a solid, long brick structure in the center room of which air passengers are received, their luggage taken in charge and custom formalities gone through. In the right wing of the building is the restaurant. To the left are the administration rooms and the post office, which is connected with other post offices in the city by pneumatic tubes for transmission of mail. Back of this is another building with a small tower for the air police, beyond which is the large concrete surface for planes awaiting passengers. Tables and chairs for the public are distributed over the flat roof of the main building.

To the right and left of the main building are the hangars, the largest of which has a length of 289 feet, a depth of 98 feet, and a front height of 39 feet; and a central workshop, the upper rooms of which have apartments for the employees of the port. In the northeast corner of the field there are several small hangars. It is intended to build further hangars along the north boundary and an especially large one in the northeast corner. A broad concrete track runs along the whole frontage of these buildings.

A meteorological station is in the main building, which is in telephonic and wireless touch with other stations all over Europe and has its own airplane that goes up daily to high altitudes for registration purposes. The wireless service of the port is well organized and comprises not only regular transmission of weather news but also of all other news pertaining to flying and flying fields. Many of the airplanes in use in Germany are equipped with wireless sets and communication with them during flight has been perfected to a satisfactory extent.

About the port are numerous fire extinguishers and call posts connected to a central post, which has a direct line to the main fire brigade station of the city. The gasoline storage tanks are divided in three separate plants installed underground and secured by an elaborate system of safety devices. The tanks hold a total of 35,215 gallons of gasoline. There are also telephone lines laid around the border of the field enabling anyone who happens to be out on the field to speak with headquarters.

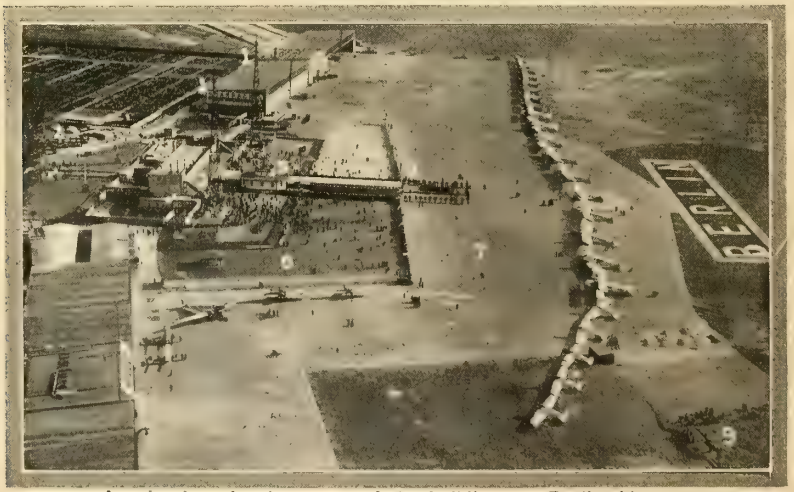
A police officer is constantly on guard in the tower watching the sky and whenever a ship is about to alight, siren blasts are sounded—one for a traffic ship, two for other ships and three as a danger signal. There is also a signalling mast on the right of the pavillion on which a large red ball is hoisted prohibiting starts when the wind is too powerful. On the left, a wind direction indicator consisting of a large white model airplane is illuminated at night. Out on the field there is a smoke stove, with only the short stack above ground, affording a good wind indicator in clear weather. A landing T is laid out, the ships having to land to the right of it. For starting, there is a police post out on the field. To this the machines have to taxi and start when a flag signal is given.

Berlin is easily discernable in the air at night,—about four miles west of the port there is the high radio tower of the Berlin Broadcasting company, fitted with a powerful rotating beacon; two miles south of the field the high tower of a newspaper building is profusely covered with red neon lights, and the port itself is distinguished by lights on the radio masts. Neon tubes are arranged all round the flying field border at intervals of 164 feet.

The front of the station building, the hangars and the concrete surface are brightly lit by seven beacons, which also partly illuminate the flying field. The German experts do not believe in floodlighting the whole field after the manner practiced in America They say more stress should be laid on equipping the machines to allow them to alight safely on even an ill-lit field. The large German machines used in night flying are provided with two powerful headlamps each in addition to the usual position lamps. They have magnesium flares, fitted at the wing tips and lighted electrically by pressing a button, which light up about 1,600 feet of ground. The Berlin port, therefore, dispenses altogether with floodlights. There is a 43.3 inch Goerz searchlight provided on a special lighting tower for emergencies, but it is not made use of regularly. Its beam can be seen some 50 miles out country. To protect it from the weather when out of action it can be let down into a special well.

Three lines of lights are laid out by setting of single lanterns by hand, where during the day the landing T is situated. The lines are parallel to one another and 328 feet apart. The central line is the longest and most intensely lighted one. It is 1,300 feet long and is divided in three sections; the first, at the end where the ship is to land, has green

(*Continued on next page*)



An air view showing some of the buildings at Berlin Airport.

1.—Radio towers of wood. 2.—Parking space. 3.—Public observation roof on administration building. 4.—Covered passageway to place where airplanes stop. 5.—Special wind vane on tower. 6.—Public enclosure. 7.—Concrete surface. 8.—Field drainage ditches.



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(Tempelhof Airport continued)

lights, the second is white and the third red. The pilot lands at the green end in the direction of the red. At the beginning of the green line there are three white lamps placed in a line crossways more clearly to mark the beginning of the green lights. After dark pilots in Germany must land to the right of the landing lights, i. e. on the opposite side to where they land during daylight. All obstacles on the field and in its vicinity are carefully marked by painting them red and white, and illuminated.

Considerable improvements are planned and some are under execution including: extensive drainage improvements, an oval concrete track around the flying field, a hotel on the port grounds, additional office buildings and waiting rooms.

The organization of the airport is as follows: the port itself with its buildings belongs to a company which is owned by the city of Berlin. Flying operations are carried on by the Deutsche Lufthansa, the big German airways company, which has leased the hangars and rooms it requires. The German Air Police Force manages the take-offs and landings and governs air traffic on the field.

GERMANY

Graf Zeppelin (LZ-127) Test Flight.

THE new German dirigible, *Graf Zeppelin* (fully described in September Aero Digest), completed its first real test flight September 20. In nine and a half hours' time, it flew a distance of more than 620 miles, passing over Lake Constance, into Switzerland, and down the Rhine. Over the Eckar Valley the ship attained an altitude of 5,570 feet, its highest during the test. Flying before the wind, the maximum speed of the dirigible for this test was 85 miles per hour.

In all, 90 persons were aboard, including a crew of thirty-nine, fifteen mechanics, and Lieut. Commander Charles E. Rosendahl, U. S. N., commander of the *Los Angeles*. After landing again at Friedrichshafen, the dirigible was put back in its hangar in less than twenty minutes.

FROM October 7 to 28, 1928, an International Aeronautical Exposition will be held in Berlin. The exhibition will be managed by the National Association of the German Aviation Industry (Reichsverband der deutschen Luftfahrtindustrie) in coöperation with the Exhibition, Fair and Tourist's Office of the City of Berlin (Ausstellungs-Messe-und Fremdenverkehrsamt der Stadt Berlin). This feature, which will draw numerous visitors from all over the world to Berlin, will be known under the name "ILA 1928" (abbreviation of Internationale Luftfahrt-Ausstellung).

Dr. H. Grathwohl is the American representative of the Berlin International Aeronautical Exposition. A booth has been reserved for the Aeronautical Chamber of Commerce at the exposition which will include photographic albums illustrating American products, and also American aeronautical magazines.

ENGLAND

The Autogiro Demonstration Flights

THE flight of Juan de la Cierva's autogiro from London to Paris, September 18, marked the longest flight ever made in any machine approximating a helicopter in design. The trip was made in stages, but only twenty minutes were required for crossing the English Channel. La Cierva, the Spanish inventor of the autogiro, was at the controls on this flight.

A complete technical description and illustrations of the La Cierva autogiro were published in the April issue of Aero Digest.

A few days after the flight from London to Paris, the autogiro, in landing at Le Bourget field after a demonstration flight, was damaged considerably when the landing gear broke, although none of the occupants were injured. After repairs have been made, La Cierva intends to continue his demonstration flights in Europe.

Aero Club of India and Burma

WHEN, at the instance of Sir Victor Sassoon, the Aero Club of India and Burma began its existence in September, 1927, its founding membership totaled 100. Within one year its membership has increased to 350, while members of associated flying clubs amount to over one thousand. The president of the club is Sir William Birdwood and the vice presidents are Sir Henry Moncrieff Smith and Mr. V. J. Patel. Among the club patrons are the Viceroy of India and several Indian Maharajas.

The Government of India, the Royal Aero Club, and the Société Aviation Internationale have recognized the club as an authority on regulations for flying meets and records of test flights for India and Burma.

Subsidiary to the central club are the Light Aeroplane Clubs at Delhi, Allahabad, Karachi, Calcutta, and Bombay. The government is coöperating with these clubs financially and otherwise to promote the interests of aviation in India.

Manager for AC British Plant

NORMAN F. STOCKBRIDGE has been appointed managing director of the AC Sphinx Sparking Plug Company of Birmingham, England. Mr. Stockbridge, a native Englishman, was formerly associated with the Associated British Tool Makers, Ltd.

Jamie G. McDougal, vice president of the AC Spark Plug Company of Flint, Michigan, is in charge of the AC foreign plants located in England and France.

Notes from England

By Edmund Hawthorne

AN Imperial Airways pilot, Captain F. Dismore, recently created a new record by flying a Handley-Page airliner from Croydon Airport to Switzerland and back in one day.

Leaving London shortly after dawn with urgent freight, Captain Dismore arrived in Zurich a little before noon, having stopped at Paris and Basle en route. The airliner was refuelled and left again for London, where it arrived at 7:35 p.m., having flown over 1,200 miles.

LONDONERS have discovered a new and interesting form of entertainment. Nearly every night at the Croydon airport the roof of the airdrome hotel is crowded with people watching the airliners from the continent arrive and alight on the grass landing surface.

FRANCE

Air Minister for France

M. LAURENT EYNAC has been appointed Minister of Air following a decision of the French Cabinet to create a separate air ministry, since the death of Maurice Bokanowski, former Minister of Commerce, whose duties also included the head of aviation activities.

M. Eynac was chosen primarily because he is a "technician". He was Under Secretary for Aeronautics from 1921 to 1926.

The Air Minister's first task will be to reorganize the French aviation.

DENMARK

THE Danish Air Traffic Company, which began service five years ago when it inaugurated an airline from Copenhagen to Hamburg, now operates regular air services from Copenhagen to all the principal cities of Europe. The Danish State Airport, its base, is located south of Copenhagen, at Kastrup. This airport, due to its position on the coast, is serviceable for both seaplanes and landplanes. The field is well equipped with night illumination, information service, etc.

The company uses a fleet of Fokker planes, many of which carry 12 to 15 passengers and baggage.

The fare, which originally was Kr. 500 for the trip from Copenhagen to Hamburg, is now no greater than first class railway passage and is nearly four times faster.

ITALY

GENERAL BALBO has been appointed the new chief of the Italian department of aeronautics, having been promoted by Premier Mussolini from the position of under secretary of the department.

General Balbo is but 32 years old and is one of the most famous of Italian air pilots.

FOUR lives have been saved recently by "Salvator" parachutes. On June last Major Cutry saved himself, although he had his hands burned and his motor on fire. On July 25th Lieut. Joseph Torrisi's parachute opened when his plane had dropped 1200 feet and brought him safely to earth.

Recently the pupil non-commissioned officer pilot Mario Mariani, of the aviation school of Cameri (near Milan), resorted to his parachute when only 100 metres from the ground in a nose dive.

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J. N. Lawrence, San Diego, California, won the prize for September.

Student flier to hangar attendant: "Just put two quarts of gas in my ship this morning."

Attendant: "What, only two quarts for a flight?"

Student: "Uh huh, this is my first solo and I want to be sure the old bird'll come down sometime."

A Child's Version

Patsy, age four, went for her first ride up in the clouds late one summer evening. While up, a little neighboring village, nestled by some small streams, had just turned on her lights for the night. When Pat landed on terra firma and found her voice she said, "Now I'd like to go and play with those little rivers and doll houses I saw all lit up."

—*M. Little.*

A white man was trying to get an old darky to take an airplane ride. He said: "Now, Mose, it is time you took a ride. I know you'll enjoy it."

Mose: "Now, Massa, I aint a gonna go so don't tease me."

"But, Mose, why not?" asked the white man.

"Its just like this, Massa," replied Mose in a disgusted tone, "if I's in an airplane, where is I? And if I is on the earth, why, here I is".

—*Neita Alldaffer.*

When Col. Lindbergh was nearing the Irish coast on his memorable trip, he heard a little knock-knock-knock, and as he went on it got worse. He was then over Ireland and getting worried. Then he thought of an idea. Turning his plane, he went over Scotland and things tightened up.

—*Robert Toan.*

A Slight Misunderstanding

"I heard rumors that there were some disagreements among the crew of your airship, Captain."

"Well, that's true. But we didn't really fall out."

—*J. G. Van Bramen.*



You will not doubt this tale is true,
For I got it straight in an interview,
From that master pilot, Johnny McGrew.
It seems in Nineteen-Twenty-Two,
He wanted to fly to Tim-buc-too,
But he had no plane and his funds were few,
And then one day he got a cue.
He sez, sez he, here's what I'll do.
With a saw and knife, he commenced to hew,
Some sticks he found of spruce and yew,
He bought some tacks and a pot of glue,
An old Ford Car from a couple of Jews,
A ball of string and a box of screws,
Some bolts and nuts and muslin too,
An electric fan he found would do
For engine and propeller, too.
And strange to say, I'm telling you,
When he cranked it up, the blamed thing flew.
In less than a week, with weather adverse,
He flew clear 'round this old universe,
But came to grief where he started first,
For his engine fell out when he tried to reverse.
It took three doctors and a Red Cross nurse
To patch him up, and then did he curse
His fate as soon as he could converse?
Not he, for his comment both simple and terse
Would help, I contend, all our ills to disperse;
"From the day you are born, till you ride in the hearse,
Things are never as bad, that they couldn't be worse."

—*Wm. M. Bryan*

An Airy Glossary

Control stick .....rolling pin
Control elements..wife, mother-in-law, etc.
Contact breaker .....divorce
Throttle .....the old gag
Hangar,
place to end it all. Bring your own rope
Nose heavy.....big head
Revolutions .....hic, hic
Bracing strut .....lamp post
Looping the loop.....mastering spaghetti
Rolling .....seven come eleven
Nosing up .....getting up
Nosing down .....retiring
Lift..what the feminine flier needs when getting into a cockpit
Air feeder .....Scotch baker
Leading edge....the man with a bold front
Trailing edge .....shirt tail
Crack up.....this ends it all

—*Edna Snyder.*

Straight for the Pearly Gates

A negro parson conducting a church near an airport, thought to impress his flock by the following comparison:

"Brudders and Sisters, *Religion* am just de same thing as a airplane. It am de means by which we travel onward and upwards. But like de airplane, your religion must have a ultra speed motor of *Righteousness,* fed by de high test gasoline of *Broderly Love;* a stout fuselage like a *Strong Heart,* a large wing spread to catch de air of *Salvation,* and cause you to soar high in de *Peace of Mind.* A propeller to stir your soul to *Higher Aims.* Your ship must have *Ample Vision* to see the *Field.*

"Den wid de *'Savior'* for your Pilot, de *Joy Stick of Divine Control* in your hand, you takes off for de *Promised Land.* Now you banks on de *Lawd,* turns your ship into righteous paths, you loops de loop around de *Devil,* nose dives into and busts up the *Clouds of Sin.* Avoiden de tail spin into *Hell* and *Damnation,* but wid your *Bible* as a compass and *Heaven* de beacon, you steer your ship straight for de *Pearly Gates.*

—*E. F. Hooks.*

1st She: "Madge certainly gives us all the 'tall hat' since she's been flying so much with young Jones!"

2nd She: "Yes, she always said she liked to feel above the rest of us!"

—*Mrs. C. A. Damm.*



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OX 5 Engine Manual, 25c.

NICHOLAS-BEAZLEY AIRPLANE CO., Inc.

MARSHALL MISSOURI

"SEE AMERICA THIRST"

(Continued from page 678)

Sacramento Mountains, which are about 10,000 feet above sea level, and at least 9,000 feet higher than they need have been. They just go to show how unequally everything is distributed in this world. There are those mountains too high and the Jersey meadows too low. If the material in the mountains could be dumped in Jersey, the meadows would be above water and the mountains would be improved by being lowered. As it is, they're a day's work for an airplane with a full load. You get up to the top of those hills and the air is so thin that there's no lift left. Even the crows can't fly across them. They fly up as far as they can, and then walk over the top. You'll see whole flocks of crows and buzzards walking over the Sacramento Mountains. That's one of the few places in the world where the birds have corns on their toes. And they get blisters on their heels sliding down the other side to a level where the air is heavy enough for them to take off again. The Rocky Mountain goats, that jump from precipice to precipice, all grow with long legs on one side and short ones on the other side, so they can stand level. If one of them ever forgets himself and turns around, it's just too bad for him, that's all.

If you have to land any place between Roswell and El Paso, a hundred miles, the chances are that it will be just like bad news from home. And if you land in the Sacramentos you needn't even send for the repair crew, because even if they find you, the only way they'll get the plane out will be by lowering a rope from the *Los Angeles*. There may be people who enjoy flying over those mountains, but I haven't met them. They're tough going for the wandering aviator. He just sits there and hopes that the Wright will keep on doing its stuff. And thanks to good workmanship, it does. It's when you're sitting over country like that, without a human being within thirty miles of you, that you get some comfort from remembering that you've never abused your motor and have always taken the best care you could of it. I looked around at my little crew as we skimmed just above those masses of rock, and they all looked kind of thoughtful and as though they wished they had led better lives, especially my wife. When we landed at El Paso I felt like sending a wire of thanks to Charlie Lawrance. If a telegram hadn't cost money, I might have sent it, too.

Next day we flew for nine hours over New Mexico and Arizona, over some of the most desolate looking deserts in the world. There's the place to fight the next war. Two armies could fight there for ten years and not injure a thing. They could dig that country up, blow it up, or cover it up, and it wouldn't look a mite worse than it does already. Long flat wastes of cactus-covered sandy soil, with heaps of mountains chucked in here and there to break the monotony and anybody's neck who tries to climb them. Yet those are rich states, with some of the finest mines in the country. But I'd never make a miner, working in a temperature of 108 in the shade, and no shade that I could see. It was 108 when we landed at Tucson, a pleasant little city, and it hadn't got any cooler when we pulled out an hour later, leaving Dick Depew and George Wies behind with motor trouble. I had to laugh to see Dick reading the Wright Instruction book, and wishing he had a mechanic with him. The more he read, the more confused he got. He might as well have been studying a treatise on early Etruscan pottery, for all the good it did him. And George had about ten per cent of his motor lying around him on the sand. I asked him if he was hunting for the center of gravity, and he told me savagely not to try being funny at 108 degrees or I might get hurt and have to stay there a long time.

Well, I moved off and drank my way along the Southern Pacific tracks to Yuma. And when I say I drank my way, I'm not joking. We had a gallon thermos jug of ice water, and between El Paso and San Diego, in nine hours, we four drank it all. The heat of that desert land is so intense that it evaporates all the moisture from your skin. You don't perspire much—you just sort of fry out until you turn brown. Don't try to fly that country without water, or you'll regret it. In addition to being thirsty in the air, if you are forced to land and have to walk far, you may not survive without water. And leave your likker in your grip until you land at the hotel. Also, stick to the railroad. Short cuts in the desert don't always pay. If you come down by the tracks you can flag a train. But if you come down thirty miles from the line it will take some

(Continued on next page)

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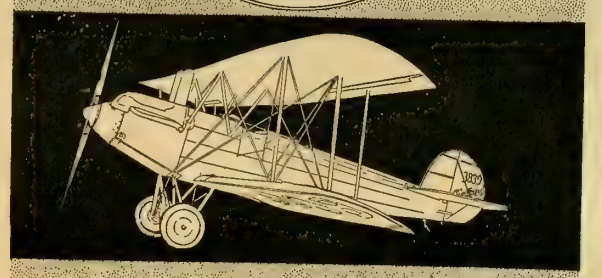
Light touch of the booster starter—roar of the powerful motor—a short run—then up and away into the blue.

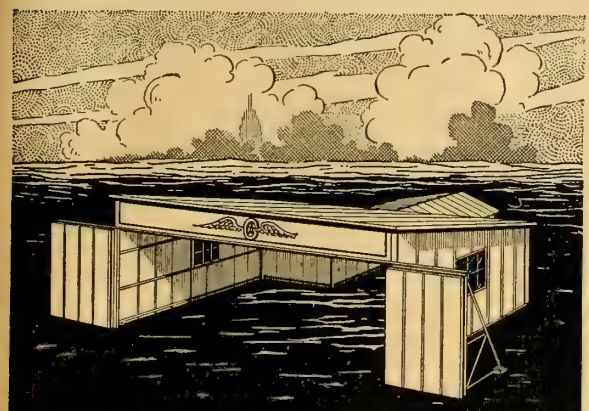
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time to build out to where you are. And thirty miles through that country is a *walk*. All those white bones in the desert don't mean that the cows merely died for the fun of the thing or from old age. In Western Texas especially I noticed a large crop of white bones of animals that had died in the drought; flying low we could see the skulls grinning up at us. The natives say that the ghosts of these cows haunt the ranges for years; but that's all bull.

But say—while flying over the deserts of Arizona it occurred to me that here, at last, I had found the ideal country for all the good American Drys—the ones who drink wet and vote dry, as well as the real extra drys. I make this humble suggestion to the Methodist Board of Temperance and Public Morals: why stay down there in Washington where you simply make yourselves miserable watching the bell-boys carrying cracked ice to the rooms of damp Congressmen, when you can move to Arizona and never see even water, let alone cracked ice Why not, folks? I'm sure you'd enjoy that dry country—and I'm sure we'd enjoy having you out there, or in the Sahara, if you'd like that better. I'll even give you a slogan for your party, gratis: "Canada Dry—why not America?"

As we passed over Yuma, sipping ice-water, the temperature in our Covered Wagon was 110. That was at the back. Up front, where I sat staring into the afternoon sun, it must have been 130. And when we landed at San Diego later and got a paper we read that Yuma had enjoyed a temperature of 110, while the Imperial Valley over which we flew next, had basked in the beneficent glare of 120 nimble degrees. No wonder Horace Greeley made his famous wise-crack, "Go wet, young man, go wet!" Which, by the way, seems to be the national slogan of to-day.

After crossing the beautifully cultivated Imperial Valley we followed that snake-like railroad that passes through the Coast Range. Any time that railroad isn't going through a tunnel it is crossing a bridge or clinging by its toes to the side of a young Alp. A regular Rocky Mountain Goat of a road. We followed it right to the border of Mexico, which we could distinguish by the rows of empty bottles and the recumbent forms of returning American tourists, then left it and hit across the high coast range to San Diego. There were a lot of old Indian ruins on top of those mountains, and if the motor had stopped there would have been a brand new ruin laid right beside them. But thanks to Spoons Boedecker's pet motor, we slid smoothly into San Diego, where we received kindly treatment from the Navy Field—no admirals being around—and pushed on to Los Angeles.

Now, folks—or soaks, as the case may be, and sometimes is—there isn't anything too good for me to say about those Californians, who gave us the best races, the best flying show, and the most wonderful hospitality and good treatment that we have ever enjoyed at Air Races. To one who was treated with contempt at Dayton, bayoneted in New York, and bored to death in Philadelphia, those Los Angeles races came as an amazing and delightful surprise. From the moment we arrived until the day we left those Californians made us feel that we were more than welcome, that they were delighted to have us, and that they couldn't do enough for us. M. L. Bach treated me like a brother—in fact, better; for no brother of mine has yet presented me with a whole keg of California sunshine, or moonshine. Harry Wetzel presented Mrs. Cy and me with tickets to the ball—and if I'd owned a dress suit I'd have gone to it, too. The Professional Pilots Association gave us a wonderful banquet and entertainment, to which the California oil companies contributed generously. The Breakfast Club entertained us as their guests, and what was still more thoughtful, the visiting ladies were royally entertained by the Pasadena and Santa Monica Chambers of Commerce. This was a great feature—taking the girls off our hands. It greatly facilitated that search for freedom of expression so much desired by the older and tougher pilots among us. If we can depend on the Cleveland entertainment committee to follow this good example next year, and just grab off the ladies as they arrive, both Billy Brock and George Haldeman will bring their wives to Cleveland.

And I must mention a lunch we were given at a place called the North Main Street Improvement Association. It was a brewery and it certainly improved that part of town. After I got out of there, or was thrown out, or fell out, or however it was, that part of Los Angeles looked better than any other part. I guess the climate was better there. A flock of Native Sons gave this party—all married,

(Continued on next page)

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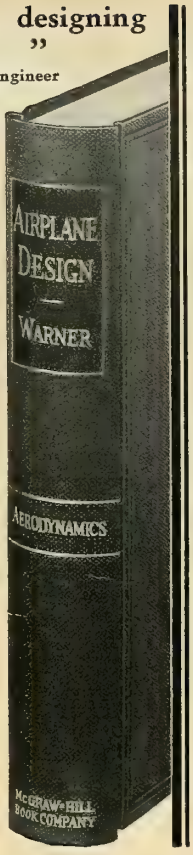
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(Continued from preceding page)

and therefore anonymous in this account. (I don't want to cause any marital recriminations.) But that was a party, brothers in Volsteadian adversity, fellow sufferers in the flesh! They showed us a vat where they make the real beer—which later is put through a process that results so unhappily in what some joker called near beer—and then laughed sardonically. The man said, "In this vat we have the real beer, and in another vat which I'll show you we have the near beer." And I said, "I'm too tired to look at the other vat." From that moment the world became brighter and better, and those about me looked more friendly and more handsome every minute. An hour in that place, and I told Carl Egge that he ought to go into the movies, as he bore a strong resemblance to John Barrymore. At the end of the lunch Egge simply laid there. We ate a real German lunch and a sort of pickled hot pepper called Chilicapelli—after which you have to fly backward to cool the back of your neck. You daren't wear a celluloid collar when you eat those things. Game finally called on account of darkness.

I'll not go into details about the Races, for in another part of AERO DIGEST you will find that covered completely. I'll just comment on a few things that won my admiration. When you're at an Air Race and don't hear a whole flock of kicks from the pilots, you're at a remarkable race. Spokane, I hear, put on a race of that description, which unfortunately I couldn't attend. The three others I attended were losses with no insurance. Hence my surprise and delight when I saw the Los Angeles exhibit.

The credit for these races is due Managing Director Cliff Henderson and the men who coöperated with him in every way. The various committees did their work to perfection. And the promptness with which every event was run off was a pleasure to those who are used to waiting and *waiting* while the harassed announcer wracks his brains for something to say to keep the crowd from going to sleep. Earle Ovington and those who worked with him to start every event on the minute are certainly to be congratulated. But if I start mentioning the names of those who contributed so largely to make this Race a success, I'll over-stay my space limits. I'll just mention Harry Wetzel, who worked so hard he sprained his back. You shouldn't try to lift a whole barrel, Harry. Lift it a glass at a time. And I certainly must mention the bell-boys at the Ambassador Hotel, who almost wore themselves out carrying cracked ice and White Rock to the rooms. They did their part like true Native Sons of toil in bringing gladness into the lives of the visiting firemen—and fire-watermen. Ed Schlee's bell-boy became so exhausted that he fainted in my arms.

Now, my dear California friends, whom I love like brothers and eighteen-year-old nieces, I know you will forgive me if I mention two little items, not in a spirit of criticism, but simply in the hope that these two matters will receive different treatment at Cleveland next year. I don't think the commercial planes were given an even break. I know that wasn't intentional, but it happened. Most of the commercial planes—all of the visiting planes, except contestants—were parked at the far side of the field where the crowd could see them only by walking more than a mile. The public may be interested in the Army and Navy planes that were parked nearest to the grandstand, but they can't buy any of them. And if these races are run to interest the public in aviation, the public should be shown the planes that they may purchase. Some pilots had flown hundreds and thousands of miles to show their planes to the public—and all that most of the people saw were bombers, observation planes, and pursuit planes. I don't know if any Chicago gang leaders were there, but if they were they were accorded every facility to pick out a good snappy bomber for use in their wards. This does not apply to planes on exhibition in the hall, which everyone could see. And perhaps it was intended that the public should see only those planes that had paid for space. If so, it is a narrow policy and should be discontinued. Let the public see all of the commercial planes that have come to the races, the planes of visitors as well as the planes of contestants. Even the contestants were parked farther away from the fence than the military planes. The Army and Navy have nothing to sell and do not need and should not demand show positions for their planes. In short, please give the commercial manufacturer and dealer more of a chance to interest the public in his wares.

My second complaint is very mild and applies to every air race I have attended. Why in the name of common sense should the ban-

quet or ball be formal and therefore exclude almost every commercial pilot? Does any pilot fly to an air race in a waiter's suit and a silk hat? I know that Roscoe Turner goes in his own trick uniform, which admits him anywhere as a celebrity—or at least as a curiosity. But the rest of us—ah, my friends, how few of us even own a Tux, let alone feel comfortable in the thing! At this race I could say, "I'm sorry I didn't bring my Tux." But if they ever hold the races in my home town I'll have to admit to my sorrow that I don't even own one of the things. I'm saving up for it, but I haven't got to it yet. I'm a simple young fellow trying to get along—without one. And if we hire one, what pathetic objects we invariably become! Consider the predicament of the thin pilot—George Wies, to mention an extreme case—prancing about in a pair of pants obviously designed to hide the nether extremities of an obese alderman. Notice with what fear and trembling the sorry wight reaches around behind him, trying vainly to derive comfort from the assurance that the huge brass safety-pin with which he has gathered two superfluous feet of material still is doing its noble duty. Consider, too, the pathetic state of mind enjoyed by such a well-cushioned (to put it mildly) pilot as Billy Brock, as he cavorts about the hall in a pair of trousers which fit him so snugly that in comparison the skin on a sausage looks baggy and wrinkled. The nimble steps, the bends, the leaps, the whirls he fain would do to delight and entrance his fair partner are quite beyond him. Or, I should say, beyond the strength of the material. And William, mark you! knows it. Just look at him, just study the agonized, questioning, hesitating air of the man and you will know that he knows, beyond the peradventure of a doubt, that if he but forgets himself and does a fandango that he will be the debutante of the ball—he will be coming out. But let us not harrow the feelings of the six gentle readers further. Suffice to say that a banquet or a ball given for pilots should be informal. The smell of moth balls, after all, adds nothing to the enjoyment of the evening.

But getting back to the field—for you have to go to the field between drinks—the greatest thrill was the formation flying of the Three Sea Hawks—Lieutenants Tomlinson, Davis and Storres of the Navy. I've never seen anything like it. The way those pilots looped, rolled, and flew upside-down in close formation gave everyone a thrill, especially as they flew only a few feet apart. The Navy VB2B Squadron, of which the Hawks formed a part, made the crowd gasp when they looped in V formation, close together, and keeping perfect formation. Their turning maneuvers high in the air were perfect, and bore witness to the remarkable leadership this Squadron enjoyed while under the temporary command of Lieut. Tomlinson, and which I am sure will be continued under the command of Lieut. Commander A. C. Davis. The formation flying of the Marine Corps Observation Squadron No. 8 was perfection itself, especially the flying in line and the dive bombing formations.

The formation work of the U. S. Army 91st Observation Squadron was a joy to watch, while the Army pursuit work was as excellent as ever, though this year it did not class with the truly remarkable flying of the Navy group. For one thing, the Army planes' motors had not been adapted to upside-down flying, as the Navy planes had been. The Navy pilots could fly apparently indefinitely upside-down, while the Army men would fly for only a few moments when their motors would begin to splutter and cut out through lack of gas. It was trying to do, at a low altitude, upside-down flying for which the carburetors were not adapted, that caused the death of Lieut. J. J. Williams, a very fine pilot and gallant officer who led the Army's Three Musketeers. With Lieutenants Woodring and Cornelius he put on a wonderful show until the sad accident that resulted in his death, after which Colonel Lindbergh led the group in formation flying.

The civilian races were, like the military races, very monotonous to watch, because the planes were racing, not against each other, but against time. You never knew who was winning, until after the race you learned who had won. Some day a contest committee may be found to be bright enough to use the Caldwell Race Control System that I invented and fully described in these columns over two years ago. But that system is so sensible and so obvious that I have no hope of its ever being adopted. If it ever is adopted, however, the public will, for the first time in the history of National Air Races, be able to tell all through the race just who is ahead. And won't

(Continued on next page)

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TOLEDO, OHIO

(Continued from preceding page)

that be a shocking change? I'll present a crochet-covered starting crank and a big hug to the first committee smart enough to try my system. They can even stick their own name on it and call it *their* system, with my blessing.

And now, folks, I've over-stayed my leave and my space and must shut up to make room for the ad on the opposite page, so I won't drag you back over the deserts and mountains with us to Wichita, where I'm finishing this against tough opposition. Three good men and true with three glasses and a flock of laughing water are debating whether I should be allowed to finish this or be forced to join them—and much against my will that would be, for I'm not a drinking man, I'd have you to know. But I've fought for a few minutes in which to tell you this sweet little incident—the little incident of Miss Ruth Elder and her cute little shoe.

Ruthie, you know, is now in pictures, which means that she doesn't exactly hide from the public gaze. Nor should she. The more she's around, the more it helps the sale of the picture, if any. And from what I hear of the first rushes, this first picture of Ruth's is going to need a lot of help. Well, Ruth was there helping, seeing and being seen. And it occurred to Ruth or to her press agent that it might be a good idea for her to fly with Al Wilson, perched out on the lower wing of his 1910 Curtiss replica. So off they went, Ruth with her little feet hanging cutely down, and wiggling back and forth. Al made a few circuits in front of the grandstand and turned at the edge of the field—and all the time there was Ruth swinging her legs and acting like she enjoyed it, which I suppose she did. Then it happened that just as the plane was directly in front of the stands, Ruth kicked just a mite harder than before—and off came one little shoe. And it also happened that just as the shoe descended, why, there was a photographer right on the spot to run out and take a picture of it for the papers. Now, wasn't that a coincidence? At least, that's what Ruth said it was. She told me so herself. And when I said, "Why didn't that shoe fall off when Al was turning at the far end of the field?" she just looked at me and said I was a mean old thing, so there. But one thing I'm glad of. I'm glad Clarence Young and Art Goebel and George Haldeman weren't around when Ruthie's shoe fell off—or the three of them might have been injured in the rush. Old as I am, I might even have rushed out and got hurt myself—and how would I ever have explained an accident like that to Mrs. Cy!

And now, friends, if you'll just turn to the ads, I'll join these three good men and do my best to reduce the awful thirst I worked up while seeing America. And as dear old George Haldeman always remarks after the fifth one, "Well, if I don't see you again—Hello!"

THE ROAD TO TOMORROW

(Continued from page 675)

us we have no doubt that it is so.

What would old Rip think, if he woke to the world of 1928? Suppose we disturb his rest in the Catskills and find out.

We find him asleep under a ledge of rock, beside him a fat green bottle, dryer than Volstead. We awaken him and lead him down through the tangle of second growth timber and underbrush to the concrete road that winds through the valley. This puzzles him a little but he has small time to be curious, since he jumps six feet into the bushes every time an automobile whizzes by, which is often. At last we get him to town and give him a shave to avoid having his beard tangled in the machinery of the modern world, and replace his shad-bellied coat and tight breeches with a mild and reasonable version of what the well-dressed man will wear. For you remember that when Kip went off to his second sleep he was no longer a ragged scamp and rascal but a respectable man about town, and probably with a nice taste in neckwear and fancy raiment, and when we get him dressed up in the fashion of 1928, he looks very much like the rest of us although a little pop-eyed and weather-worn.

So we buy him breakfast and have the devil of a time finding something that he thinks is fit to eat, but make out pretty well at last with buckwheat cake and maple syrup. We put him in a car and start off for New York. For the first twenty miles he prays continuously in Dutch, but at last begins to sit up and take

notice and even to enjoy himself. Then we hit Jersey City and he takes refuge once more in prayer. We ferry him across the river and lead him into a subway, where he is pushed and hustled and bullied and stepped on and crammed into a car that was full ten minutes ago, and at last shot under the ground at 40 miles an hour to Times Square. Here we all get lost in the Shuttle for ten minutes or so, but at last come up for air into the busiest cross-roads corner in the world.

So far Rip hasn't had a chance to think what it is all about, and he certainly won't find it here. The only way we can get him across the street is by blindfolding and carrying him, and every time a taxi hoots he thinks it is after him. So we take him to a train and rush him out to the airport, and lay him in a quiet corner of the hangar to think it over before he starts his next adventure.

When we come back he is sitting up, pale but cheerful, and full of a new discovery. It has dawned upon him that the modern world is in a hurry. Everybody is in a hurry, even if they aren't going anywhere in particular and have no particular reason for going there. This is a tremendous idea, and one that accounts for everything. So he makes no kick when we load him into the cabin of a plane and start him out to see the world as he has never seen it before.

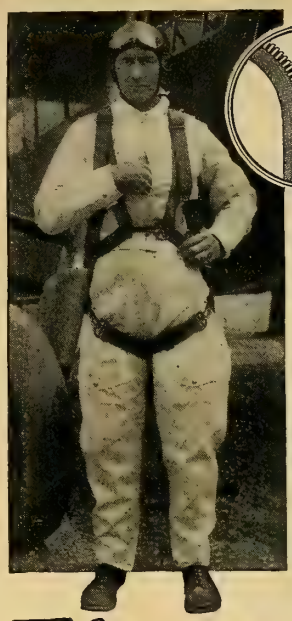
Rip has lived a long while, with some time out for his naps; he has seen the quiet life of another century and caught a glimpse of ours. But now he sees what he has never seen, nor any man of any generation earlier than our own. The world is spread beneath him like a shallow bowl, rimmed with the far horizon, patterned and patched with the affairs of men. Towns and villages are toy clusters far below, rivers are like silver threads, hills and mountains are dwarfed and flattened by distance, roads are thin white threads laced over the skin of the earth. We fly across his own familiar hills and valleys, and in an hour have skimmed a distance that would once have taken him days on foot. Moreover, he is now free of the crowds and crush of the city; riding smoothly and comfortably on the wings of the wind, tasting the intoxicating freedom of the skies. He's a tough old bird and his experience of New York streets and subways has exhausted his capacity for nerves or apprehensions, so now he simply enjoys himself.

We land him at last 'way up state at the edge of his own mountains. He's getting sleepy again, and none of us care much for the idea of paying his room rent in a New York hotel for another twenty years. So we take him up in the hills until he finds a soft rock to his liking and hand him a copy of the *Congressional Record* for a bedtime story, and in ten minutes he is asleep again. And so we leave him to dream about it all. In another score of years he will wake again. By that time real estate will have crawled over the hills, and he will be surrounded by bungalow sites for sale and bungalow sights in smocks and long hair who will inhabit the artists' colonies of that neighbourhood. Maybe they will drag him down for another look at the three-ring circus of civilization. What will it be like?

Nobody knows. But there's no harm in guessing, and we can make a better job of it than some who have done it before. No sensible man today dares to say, "It is finished," to any marvel of the modern world. We have been fooled so often by that sort of pessimism that we have learned to be careful. Lately I discovered in the family archives a catalog of the National Automobile Show of 1908. It was full of pictures of high-rigged cars that looked like crosses between buggies and thrashing machines, and several of the manufacturers were there with the solemn statements that no new models were offered because "no further improvements were possible". Tires were advertised with a "positive guarantee" of *five hundred miles* service without punctures or blow-outs. So much for the short-sightedness of people who should know better.

So when Rip comes back, what will he see? Cities no longer huddled in crowded profusion, piled and pyramided to the skies, but spread abroad by the magic of modern transportation so that all can have their share of light and air and a scrap of land to work and play and grow in. Highways for pleasure cars alone; others set aside for business on wheels; all wide and smooth and safe for the speed we must have to match our modern needs. Railroads carrying chiefly great trains of fast freight, so that no production is far in time from its market. And what of the air? Air-lanes every-

(Continued on next page)





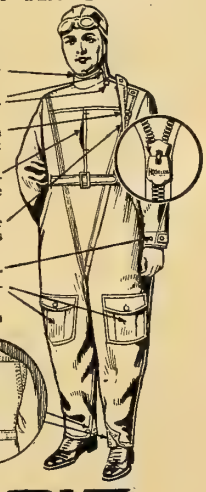
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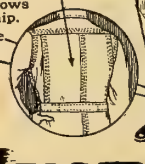
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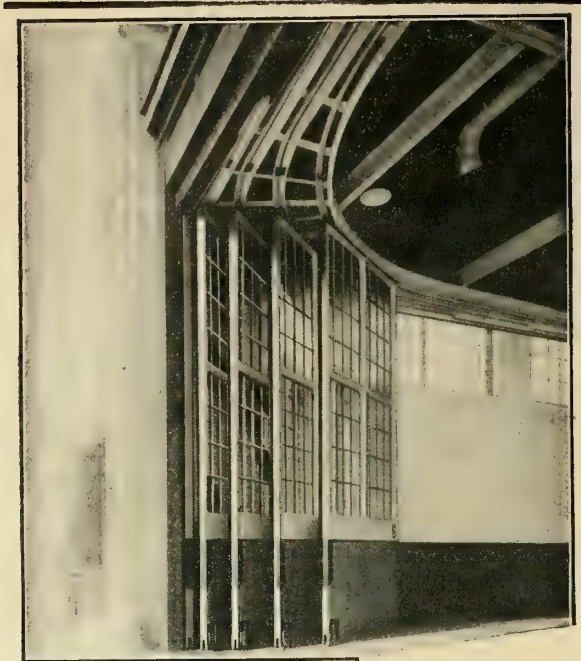
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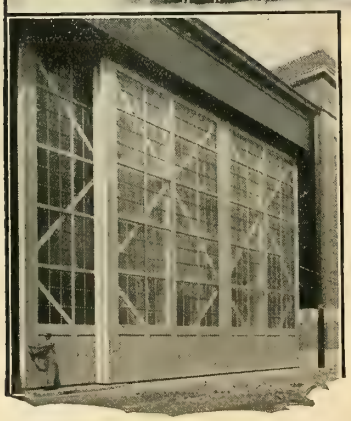
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Close-up view of Truscon Steel Doors, Curved Track Type, in Ford Airplane Hangar, Lansing, Illinois. Albert Kahn, Inc., Architects, Ralph Sollitt & Sons, Contractors.



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(Continued from preceding page)

where, where ride those who must travel far and fast, with ships of the air making three hundred miles an hour in ease, safety and comfort. Pilots released from the strain and uncertainty of trusting alone in their own eyes and hands, and guided by invisible threads of vibrating ether, routed and directed from control stations spread everywhere across the land below.

Airports at every city and town, and new cities grown up around the nerve centers of aerial transportation. Everywhere the same natural law at work,—that slow weight and brief distances belong to land travel, but speed belongs to the air.

If Rip Van Winkle comes back often enough, he will learn the fundamental fact of human society—that methods change but human nature does not. Society was first made possible by communication and transportation, and the history of civilization could be written in terms of talk and travel. The vanishing horse has moved out of the center of the picture, not because there is anything wrong with the horse as a horse, but because Henry Ford and his competitors made a better beast of burden out of scrap-iron and rubber. The object is the same—to get around as quickly as possible. Because there are so many things that the airplane can do better than a machine which crawls on the ground, the plane must surely ride to triumph in the heyday of the 20th century. And none of your pessimists can stop it.

They can't stop it, but they can crab the act. There are still a few people who ride behind horses down Fifth Avenue. They get in other people's way, they give traffic cops epilepsy, and they waste their own time. There are still people who will waste a day's time on a business deal to save five cents for one of those pretty new air-mail stamps. There are still people who glory in the fact that they are perfectly satisfied with what satisfied their grandfathers, and who pride themselves on being conservatives, stand-patters and reactionaries. As a matter of fact, they are simply asleep, like old Rip Van Winkle.

The new world is the same old world, as far as all the vital human characteristics and habits are concerned. There's no great difference between our appetites and desires, our ambitions and hopes, our pleasures, miseries and mutual problems, and those of ancient Egypt or Greece or the Middle Ages in Europe. But there's a world of difference in the tools we work with. Those who want to make the best of the world as they find it will save their sentiment for the eternal spiritual realities by which men have always lived and which are still the mainspring of society, and will use good hard sense to find every possible advantage in the new machinery of civilization. They will keep a soft spot for the horse, for the sake of his gallant and faithful heart, for his sleek beauty and grace, for the pleasure of straddling his broad back in a country bridle-path, but they won't insist on riding him down Fifth Avenue.

THE TORTOISE AT THE AIR RACES

(Continued from page 739)

Charles L. Lawrance, head of the Wright Organization.

Among the dignitaries at the races were Major General James E. Fechet, Chief of the Army Air Corps, Rear Admiral William A. Moffett, Chief of the Navy Bureau of Aeronautics, and Secretaries Warner and MacCracken in charge of air activities in the Navy and Department of Commerce. Major Clarence M. Young, suave, smiling with a surface appearance of being an easy-going fellow, had charge before Mr. MacCracken's arrival and was compelled more or less to "read the riot act" to those in charge of the races when the latter began to assume a Roman holiday aspect as a result of unrestrained stunt flying and rivalry between the Army and Navy. Major Henry B. ("Crack 'em Up") Claggett was the ranking air officer on Mines Field until Fechet's arrival and occasioned much grief and more wails among his followers by barring Army training planes from participating in the races for which they had been entered. The effect of this was to keep the PT pilots from having a lot of fun they had planned but no speed records are believed to have been lost to the aero-

nautical world.

William S. Brock and Edward F. Schlee, round-the-world fliers of 1927, had ringside seats for the finish of the non-stop race from New York and were rooting for George W. Haldeman, Miss Elder's pilot, in a Brock and Schlee Bellanca monoplane. When Art Goebel's Lockheed flashed over the finish line, the apparent winner of the race, their faces gradually lengthened until they were resting on their knees. There was a magic return from the depths when a newspaper man told them Goebel had been forced to land for fuel and was disqualified.

INVERTED FLIGHT

(Continued from page 673)

point. To permit the nose of the plane to travel to either side of the straight line flight path meant the spoiling of the maneuver and resulted in more queer gyrations than he will venture to describe.

From the accompanying chart, Figure 3, it will be noted that the negative vertical acceleration reached a maximum of minus 2.8g. While it is admitted that the vertical accelerations did not at any time reach alarming points, the records of the recording accelerometer were a surprise when first examined. Prior to consulting the records, the opinion had been formed that the vertical acceleration must have amounted to at least -4g. It is believed that this exaggerated estimate can be explained by the facts that:

(1) The pilot had been subjected to negative accelerations and because he was unused to such an experience his sensations were therefore registered in an aggravated form and—

(2) Because the human body does not seem to withstand negative vertical accelerations so well as it does the positive vertical accelerations.

(*In the November* AERO DIGEST, *Lieutenant Williams will deal with the "outside loop", the vertical figure "S" and other experimental maneuvers, physical reactions and acrobatics*).

LESSONS FROM THE 1928 AIR RACES

(Continued from page 727)

however, would like to know why even at the national air races the army regulations requiring pilots to maintain a reasonably safe altitude while stunting were allowed to go by the board. Lieutenant J. J. Williams, who gave his life in upholding the traditions of his service against its friendly rival the Navy, was certainly less than a thousand feet from the ground when he rolled his plane on its back. Many who saw his fall estimate that he was rolling the ship when within a hundred feet of the ground. Williams was not alone in this for both the army and navy pilots put on remarkable displays when well below the thousand-foot limit, as the accompanying illustration on page 722 will show.

It is admitted that the public demonstrations of our air defense arms are of great educational value and should be supported and continued, but next year let us hope that the traditional rivalry between the pilots of our Army and Navy be not carried to the point where men like Lieutenant Williams give their lives in a foolish stunt. It is a fact that the crash of Williams following closely on the crash of Navy Lieutenant George Hasselman damaged to some extent the valuable educational work going on in the exposition itself.

In their efforts to provide entertainment the backers of the National Air Races for 1928 tried hard not to miss a bet and perhaps they went a little too far. Just what place movie actors whose talents have not made them famous have in an air race program is a bit mystifying. Introducing them in job lots over the broadcaster may have been good publicity for them but it was a total waste of time as far as persuading the guests on the sidelines to be more air-minded.

These, however, are small matters and perhaps more or less indigenous to the climate in which Hollywood flourishes. The important thing to realize from the National Air Races of 1928 is that they were more than ever worth while.

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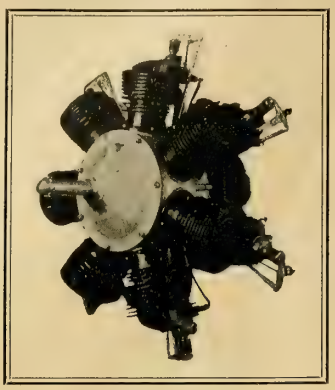
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THE KIMBALL AIRCRAFT CORPORATION
NAUGATUCK, CONN.

NOTICE OF RECEIVERS' SALE
In Chancery of New Jersey

BETWEEN
BOUND BROOK OIL-LESS BEARING COMPANY,
a corporation,
Complainant,
and
SAUZEDDE CORPORATION,
Defendant.

By virtue of an order made in the above entitled cause by the Chancellor of the State of New Jersey on March 15, 1928, whereby the undersigned were appointed receivers of Sauzedde Corporation with full power and authority to sell, convey and assign any and all of the real and personal estate of the defendant corporation, we will expose to sale at public vendue on Tuesday October 2, 1928, at 2 P. M., at the premises of the Sauzedde Corporation, Lincoln Boulevard, Middlesex Borough, Middlesex County, New Jersey, all of the property of Sauzedde Corporation, except accounts receivable and cash, as follows: 1. Machinery and equipment now in the said plant consisting of:—

4 Hendley lathes	1 horn press
1 Pratt and Whitney lathe	1 Loshbough Jordan press
3 Universal Milling machines	1 Barber Colman Hobber
6 Drill presses	1 U. S. Electric Grinder
1 Hand mill	1 Heald Demagnetizer
3 Screw machines	1 D C Generator
2 Turret lathes	1 Prexto Rotary Shear

Miscellaneous lot of trucks, stands, benches, vices, tools, jigs, fixtures, patterns and drawings.

2. Miscellaneous lot of finished parts ready for assembly in airplane wheels. Miscellaneous lot of Sauzedde airplane wheels. Miscellaneous lot of raw stock.

3. Office fixtures consisting of: 2 filing cabinets, safe cabinet, files and miscellaneous items.

4. The going business of Sauzedde Corporation now being carried on by the undersigned as receivers, including orders taken for future delivery, together with the good will of the company.

5. An exclusive license to manufacture, use and sell certain patented improvements and devices in wire wheel construction, in hub-lock construction, and in brake construction for automobiles and airplanes, and certain unpatented improvements and devices, together with an option to purchase, dated January 7, 1927, given by Claude Sauzedde to the Sauzedde Corporation, a Michigan corporation, and assigned by the said Sauzedde Corporation, a Michigan corporation, to Sauzedde Corporation, a New Jersey corporation, the defendant company, by assignment dated August 8, 1927, as modified by an agreement between Claude Sauzedde and Sauzedde Corporation, a New Jersey corporation, dated August 8, 1927.

6. All other assets of Sauzedde Corporation excepting accounts receivable and cash.

The said property can be inspected and examined at any time during business hours at the plant of the Sauzedde Corporation, Lincoln Boulevard, Middlesex Borough, Middlesex County, New Jersey.

Said sale will be subject to confirmation by the Chancellor of the State of New Jersey.

Dated Sept. 7, 1928.

R. E. & A. D. Watson
Solicitors
46 Bayard St., New Brunswick, N. J.

William F. Jennings and
Thomas H. Hagerty, Receivers of
Sauzedde Corporation.

AERIAL NAVIGATION EXAMPLES

(Continued from page 670)

clouds. If the plane is above the clouds, either the upper cloud level may be used as a natural horizon (the navigator estimating his altitude above this new horizon), or the bubble sextant, even with its probable errors, must be relied upon.

Prior to starting a flight the navigator is advised to make notes of the bright stars at morning and evening twilight, with their approximate location in the heavens for that date, together with their right ascension and declination.

The following examples are worked by using the "Line of Position Book" by the writer. Since these problems were made up, the new "Star Altitude Curves" have been completed for 10° to 60° North. With these curves, a GST second-setting watch, and a bubble sextant, positions may be worked every few minutes through the night and with only about a fourth of the time and labor required by the usual methods. During the day a sextant, a GAT second-setting watch, the "Line of Position Book", plotting sheets for the required latitudes, parallel rulers, dividers and pencil are required.

METHOD OF SOLUTION FOR THE ALTITUDE DIFFERENCE

(1) Convert the GHA into degrees.

(2) Apply to the GHA an assumed longitude (nearest DR longitude), which will make the local hour angle an integral number of degrees.

(3) Assume a latitude (integral degrees) nearest the DR latitude.

(4) Enter table A with LHA and with the assumed latitude and take out A and K. The HA is at the top, and L at left margin. If the LHA is greater than 90°, enter table A at bottom and take out A and 180°—K, and then subtract this value from 180° to find K. For example, if 180°—K=78°, K=180°—78°=102°.

(5) Enter table B with K~d and take out B. To find K~d, give K the sign of latitude, and then combine K and the declination algebraically; i.e., the sums when signs are unlike, and the difference when the signs are alike.

(6) Enter table B with A plus B and take out the computed altitude; the degrees of altitude appearing at the bottom and the minutes of altitude at the right margin.

(7) The difference between the computed (Hc) and the observed (Ho) altitudes is the altitude difference (Hc ~ Ho=a); the altitude difference, "a", is measured from the assumed position toward the body when the Ho is greater than Hc, and away when smaller. The line of position is at the distance, "a", from the assumed position and is laid off at right angles to the bearing of the body.

Note:—The tables give an accuracy of solution to within 1′ of altitude, without interpolation; for closer results interpolate in table B.

METHOD OF SOLUTION FOR THE AZIMUTH

(1) Enter left margin with HA or with 180°—HA., if HA is over 90°.

(2) Then follow the horizontal line to the declination curve.

(3) Then follow the vertical line to the altitude curve.

(4) Then follow the horizontal line to right margin and pick off azimuth (Z).

(5) For naming the azimuth, give Z the name of the quadrant in which the body is found; for example, if body bears NW and Z is 80, Z=N.80W, and Zn=280.

EXAMPLE

(1) At evening twilight on April 17, 1928, the navigator of a plane following a modified great-circle course on a non-stop flight from Hampton Roads, Va., to Cherbourg, France, determines his true latitude, from a sight of the star Polaris, to be 40° North at 1910, 75th meridian time (Zone plus 5). Assumed ground speed, 120 knots; course 45° (true). GST watch used, and sextant adjusted.

His DR position at time of this sight is latitude 39° 50′ N., longitude 70° 15′ W. Four minutes later, using an ordinary sextant (adjusted) and natural horizon and a second-setting GST watch, he observes the star Sirius, bearing SW, as follows: W. $13^h\ 39^m\ 10.4^s$, height of eye, 500 feet, altitude (Hs), 25° 30′ (subtract correction of 24′ from page 1, Weems, and write Ho = 25° 06′). His DR

position at time of sight is latitude 39° 56′ N., longitude 70° 07′, 5 W.

The position line for Sirius plots as shown in the accompanying diagram on page 670.

PASSAGE HAMPTON ROADS TO CHERBOURG

17 April, 1928	1 SIRIUS	2 SUN
GCT (or GST)	13-39-10.4	.....
EQT (or RA)	6-41-57.8	.....
GAT	.....	12-35-23.9
GHA (Time)	6-57-12.6	0-35-23.9
GHA (Arc)	104°-18′W	8-51 W
LONG. (Assumed)	70-18 W	39-51 W
LHA	34° W	31° E
LAT. (Assumed)	40 N	50 N
K	45-20.7 N	54-16.5N
±		
DEC	16-37. 1S	10-50.8N
K∼DEC.	61-57.8	43-25.7
A	4402	2521
+		
B	32792	13896
LOG Hc	37194	16417
Hc	25-08	43-15
Ho	25-06	43-24
a	2′A	9′T
Z	S36°W	S44E

During the night the plane continued changing course to conform to the great-circle route.

(2) The following morning, having been unable to obtain star sights during the night or morning twilight, the navigator observes the sun (lower limb) for line of position as follows: DR lat. 50° N., long. 40° W.; assumed ground speed, 115 knots; course, 75° (true); height of eye 1,000 feet; altitude (Hs), 43° 40′; (correction page 2 = minus 16′). W. (keeping GAT) $12^h35^m23.9^s$.

The sun's position line may be plotted in a similar manner to the one illustrated here.

START OF TRANSCONTINENTAL RACES

(Continued from page 730)

Four days elapsed between Class B and C take-offs and the start of the non-stop event. This great race drew nine contestants. Each pilot could take-off at any time he desired between dawn and dusk on September 12th, the rules of the race prescribing that he arrive at Mines Field between 8 a. m. and 6 p. m. on September 13th.

Four Bellancas were pitted against two Lockheed Vegas, a Stinson-Detroiter, a Stinson, Jr., and a Buhl Airsedan. No restrictions as to the amount of gas and oil carried were prescribed by the rules committee. This being so, it was necessary to weigh every ship fully loaded and check the gross weight with the manufacturer's safe gross load for each ship. This was very carefully worked out, for the flying conditions on the field were close to the danger point, and no ship was permitted to carry weight in excess of the load set down by the manufacturer. The race was open to all type ships powered with any type motor, cubic inch displacement unlimited. This brought out the Stinson, Jr., powered with the 110 h.p. Warner Scarab motor, as the lowest powered ship in the race and the Lockheed Vega, powered with the 525 h.p. Pratt and Whitney Hornet, as the highest powered ship in the race.

The day was very hot, with thin, dry air blowing directly across the runway at 8 m.p.h. The first plane off on the long hop was the Stinson flown by Clifford McMillin, at ten hours, thirty-four minutes and ten seconds. Taking advantage of nearly the full length of the runway, McMillin made a magnificent take-off, flying low over Curtiss Field to gain altitude slowly.

(Continued on next page)



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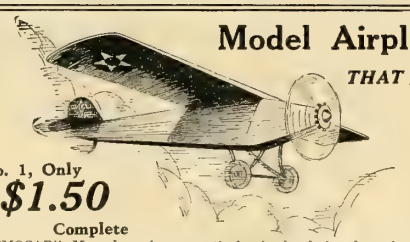
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(Continued from preceding page)

Nick Mamer in his Buhl Airsedan couldn't make it on his first attempt but taxied back quickly and coolly lifted his ship off after a hair-raising run down the field.

Randolph Page made a beautiful take-off in the little Stinson, loaded to the staggering limit with fuel, but he was forced to dump his load and come back for a second start.

It was growing dark when Arthur Goebel took off in the *Yankee Doodle*. He got away quickly gaining altitude rapidly as he disappeared into the sunset.

Morris, in the Lockheed Hornet engined Vega, got away just before darkness set in. With his powerful motor opened up, he climbed rapidly after a short run and was gone.

The run of each plane on the ground before take-off, in seconds and in distance, was carefully checked, so that much valuable data was obtained on performance with these various types of ship with load.

No lives were lost in these events, although the planes had a total of over 200,000 miles adding each plane's mileage together. Those who failed to finish advanced the cause of flying through the lessons learned from motor and engine failure.

AIR—HOT AND OTHERWISE

(Continued from page 674)

IN my enthusiasm over such like matters I have come near forgetting that a convention was held out there while all this was going on, up, down, around, and in and out but never absent from sight, hearing or mind. That convention was not sensational, of course, for it was the annual meeting of the N. A. A., but it was notable in that it indicates, perhaps, that this hitherto unfortunate and rather useless body, either by accident or design, is now capable of lucid, even brilliant moments. Having at last made a trial of sanity, perhaps it will like it and stay normal.

The 1928 convention, in choosing for the organization's president Senator Bingham, of Connecticut, gives him an opportunity to take an article utterly without worth and make of it a very useful one. This sensible election followed six long and dreadful years of absolute control by the Navy which so misdirected its affairs that the body which claims to be America's chief representative in aeronautics failed in every purpose in which it had been its founders' thought to make it succeed.

If Senator Bingham has his way the N. A. A. from now on will be something real. He is an Army man and an Air man. He knows how necessary it is that the United States should have a civilian organization to back up every right point in the programs of the Air Services.

Senator Bingham, by his election to this place, has been put in a strategic position affording him an opportunity of unexampled scope. I will not say that the president of the N. A. A., if working with intelligence and patriotism, might be as important as the President of the Nation, but I will say that, conceivably, he might do more for the nation than any other one man except the Nation's President.

With Senator Bingham in the upper house of Congress fighting the battles of American aeronautics, and, outside that chamber, building up an organization competent and inclined to back him, the whole American air picture inevitably must change, and the N. A. A. must be transformed from a smudge upon the nation's airscape to a bright spot in it like unto the glow of sunshine on a cloud which hitherto has been a leaden, sickly grey—one of those clouds, you know, with vapors of all useless sorts in it, producing only wind and rain when you have left umbrellas in the hatrack.

We believe that Senator Bingham will energetically and with rare intelligence make the N. A. A. now fight the battles which must be fought for aviation as competently as he previously has fought them as an individual. If he does this, he will have the full support of every air-minded person in this country, and these persons grow in number—yea, verily, they do! While we have not always agreed with the air policies of the Senator we are for him

in his new position. He can be a real life-saver for the N. A. A., at a time when we had abandoned as an idle dream the possibility of such a Coming.

We are for the Senator in his new job. We congratulate the members of the N. A. A. because they have had the sense to ask for him and the good luck to get him—an able, honest and important citizen who will do hard work and lots of it for the cause. Bingham is a fighter and he will not shirk.

Our friends down in the Navy will find themselves, from now on, when they start to get support for their proverbially extraordinary schemes, confronted by a mind which has no moths in it; a mind which won't concur with any plan which does not mean the furtherance of aeronautics. If they are laboring under the impression that the chief function of the President of the N. A. A. will be, during Senator Bingham's term, as it has been during so many other presidents' terms to attend five o'clock teas and act as yes-man for the more overstuffed among our Naval uniforms and the occupants of those lovely gowns which cling admiringly to the highly decorated sleeves of Naval uniforms, they will find themselves in error. Senator Bingham will not be a checker for our admirals to move about at will as they play their usual game upon that board which forms the field of the bloodless, antipatriotic, stupid game of Navy politics.

A DEPARTMENT OF NATIONAL DEFENSE

(*Continued from page 667*)

on Military Affairs of the House of Representatives, passed both the House and the Senate unanimously and was signed by the President. If we had had a Secretary of National Defense he would undoubtedly have taken, years ago, the same attitude I did and the matter would have been settled long ago and before the controversy ever became acute. Had the dispute been settled when it first arose, the new field, which we are now just procuring for for the Army on the mainland and which we have yet to build, would have been ready and in use long ago.

At North Island, near San Diego, a very similar situation exists. Joint boards have not settled the controversies in these places although they have been considered by the Joint Board upon numerous occasions. Under existing conditions it seems necessary that Congress itself must intervene to settle these questions. Under a Department of National Defense they would be settled by the secretary of that department.

One of the outstanding questions of the present time is the relation of air forces to the land and naval forces in the defense of our coastline. This question is not yet satisfactorily settled. Here Congress is directly concerned because on the settlement of this question depends, under existing conditions, the allotments of money for aircraft for the Army and Navy.

Prior to the introduction of aircraft as a weapon in war, an enemy gun had to be carried on a ship to within about twenty miles of the shoreline in order to bombard the coast. Recently a mail plane, carried on a foreign ocean liner coming from Europe, left the ship some 600 miles from shore and brought the mail to New York City. That foreign-built plane could carry a bomb with as great or greater destroying power than the largest naval gun. The distance which that plane covered represents the proven distance from which our shoreline could have been attacked under modern conditions of war by that plane.

Where does this bombing airplane fit in with the land and naval forces which attack and defend coastlines?

It is an important question to settle and one in the settlement of which pride of service (valuable an asset as that is) must not be allowed to enter. In my judgment this is a question which Congress will not settle. I believe a Department of National Defense will provide the proper means for the settlement of this question.

In matters of administration there are many difficulties under existing conditions. In Panama, though I was making an official inspection of Army housing conditions there and was accompanied by the Commander of the Army Forces in Panama, I found I could not get off an Army transport on the Atlantic side and begin my inspection there without special authority of some naval officer

(*Continued on next page*)

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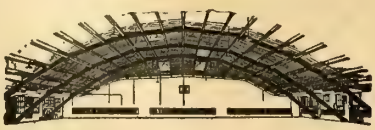
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(Continued from preceding page)

there. Without this special authority (which had to include my brief-case as well as myself), I would have had to disembark on the Pacific side and then return to the Atlantic side to begin my inspection.

In the matter of rank of both officers and enlisted men the Navy is vastly better administered than the Army. A young man contemplating service in his country's armed forces, whether as an officer or as an enlisted man, will find prospects for promotion and advancement far better in the Navy than in the Army. Where both services recruit from the same field (as they do), this difference in opportunity is bound to affect both services and ultimately the efficiency of our National Defense Forces.

The Army is the older and the senior service, but as I have told General Summerall, the present Chief-of-Staff of the Army, he is lucky when he meets the Navy in conference, to be "the outside sentinel". The Navy has four officers with the rank of full admiral (that is the same rank that Admiral Dewey had and the rank which corresponds to that of General Pershing in the Army) and three officers with the rank of vice-admiral which is one grade lower; while the Army, now that General Pershing is retired, has no officer with rank higher than that of major general, which is two full grades below these four senior officers in the Navy and one full grade below the next senior officers in the Navy. These matters might be corrected by Congress. In fact, since they have come to our attention in Congress, an effort is being made to correct them. But the point I am making is that under a single Department of National Defense these differences never would have developed, and if a single Department of National Defense is now organized they would in my opinion be wiped out.

Before the war the proper defense of New York City was found in a very elaborate system of coast defenses. Now with the advent of aviation the defense of New York City is largely dependent upon the airplane. Hence we have Mitchel Field here in the vicinity of the city.

When in Boston the other day, I inquired if the Army had any place near Boston which could be used as an aviation field. I found that the Army had no such place available and that no suitable land can be secured from private interests. Upon inquiry, however, I did find that the Navy has land at a place called Squantum which is exactly suited for the Army's purpose and is not needed by the Navy. There are over 200 acres now in the tract and as it is on the shore of Boston Harbor as much more land can be reclaimed as may be needed. The Navy Department, however, instead of being willing to turn this property over to the War Department, seems inclined to want to lease it to private interests. Under a Department of National Defense this question would be promptly and properly settled.

I have mentioned only a few examples to show differences which ought not to exist, differences which in my opinion interfere with the best development of our National Defense Plan. Those I have referred to relate primarily to administration, although the question of rank is vital in the exercise of command and therefore involves directly joint operations. Referring to joint operations of the land and naval forces, I remember a discussion of this subject during the hearings before the Military Affairs Committee of the House

of Representatives in which it was pointed out that in joint operations the command of the combined forces devolves upon the Army officer or the Navy officer according to the principle of paramount interest. Specific reference was made during the hearings to the defense of New York City, and it was pointed out that the command of the combined forces might be first under a Naval officer then shift to an Army officer and finally shift back again to a Navy officer. At the time I made the observation that while we were shifting the command back and forth between the Army and Navy the enemy probably would be engaged in the destruction of New York.

I am sure history will confirm the soundness of the principle of unity of command where land and naval forces are concerned as well as where these forces are concerned separately, and I feel certain that this same principle of unity of command can and should be applied in the future in the conduct of operations by land, sea and air.

Any legislation for a Department of National Defense should provide the means for wiping out inequalities and duplications which now exist in the Army and Navy and should provide for giving to the people the best possible organization of both the Army and Navy for National Defense and, under the operation of the National Defense Department, the place of aviation should be properly determined so that the forces which operate in the air will be correctly organized and trained. Then if war does come, the President in my opinion will be better able than he ever has been in the past to direct the operations of all of our forces whether they be on land, on sea, or in the air.

The National Defense Department should not only provide adequate representation in its councils for the land, naval and air forces, but the vital problem of munitions for all the armed forces should be given equal representation. Under existing conditions there is no question but that the taxpayer suffers from unnecessary duplication in procurement of munitions for the Army and Navy. Under a Department of National Defense the machinery will be set up which will wipe out all such duplications and give to the taxpayer the greatest value for every dollar which is expended for National Defense. And the situation which has existed in the past, where the Army and Navy were competing in the same fields in time of war, will be completely eliminated.

In other words, I believe that with a Department of National Defense administered by a single Cabinet officer whose acts are those of the President himself, preparation for war will be better and more economical and the conduct of war will be far more effective than it ever has been in the past.

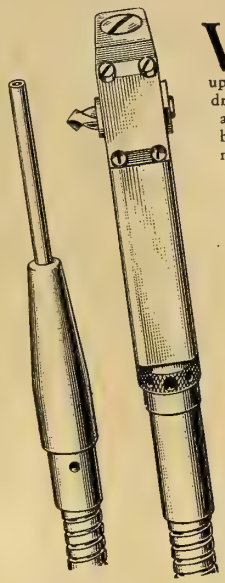
THE LONDON TEST RAIDS

(*Continued from page 669*)

The lesson? There isn't any. Although right here is an excellent chance for some future munitionaire to get to work immediately and invent a gas respirator through which you can drink—for that, at least, would be a comforting exhibit in the welter of ghastly evidence the countries of the world are industriously piling up for the future.

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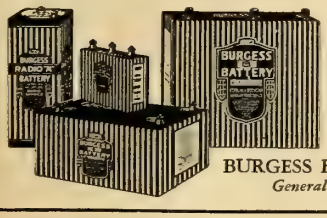
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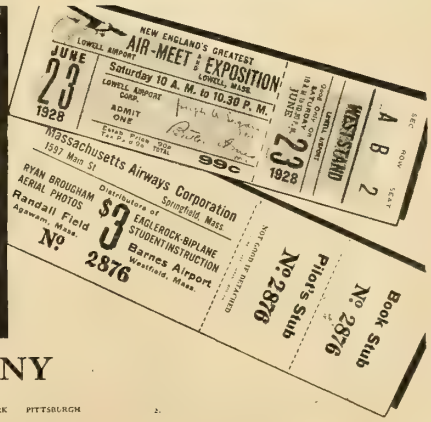
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We have a small book on aircraft construction which gives the correct size of wings, wing loading, H.P. loading, fuselage, rudder, fin, stabilizer and how to balance ship. Price, 50c. Blueprints of small one-place ship using motorcycle or Lawrance 28 H.P. motor, $2.50. Prints of 2-place ship using 50 H.P. Gnome, 60 Anzani, etc., $5. We build wings, steel fuselages, tail groups, ships to your specifications. There is no higher mark of quality than——BUILT BY
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Advertisements on these pages are selling practically every part used on an airplane. But . . . if there is some part which, for some reason or other, you have trouble in finding, try running a "WANTED" advertisement here. Then if you can't find it, you may be reasonably sure it isn't made.

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This plane will use any motor of 60 to 130 h. p. A small, high wing cabin monoplane, two seats staggered to give both pilot and passenger plenty of room. Excellent visibility.

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Distinctly different in construction, proven by every test to be superior, the Paragon MONOID represents a marked advancement in propeller development. It meets the demand for a propeller of light weight and maximum efficiency and durability. Write for literature and prices.

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Write Dept. "A".
BECKER'S
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Jamaica, N. Y.



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Air Transport Engineers
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NEW OX5 PARTS

Upper crank case, $120.00; brand new cylinders, $25.00; new valve action assemblies, per cylinder, $10.00; water inlet manifolds, $5.00; intake manifolds, $9.00; intake Y manifold, $10.00; new exhaust manifold $8.00; complete set 20 hose connections, $2.00; complete set 80 gaskets, $3.00; complete set 41 hose clamps, $1.50; complete set of OX 5 tools, $12.00. "WE SHIP THE SAME DAY"

NICHOLAS-BEASLEY AIRPLANE CO., Inc.
Marshall, Missouri

OX5 & HISSO MOTORS

Curtiss JN4D training planes and parts.
Distributor for Swallow Airplanes
See our advertisement on page 824
Let us give you our quotation on what you need; we can save you money.

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Of all materials for airplane construction Advice on Specifications—Heat Treatment. All work in charge of chemists and metallurgists of recognized experience in automotive engineering and under supervision of Government Inspectors if desired.

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Parts for all types

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WRITE OR WIRE US YOUR REQUIREMENTS
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HAVE THE FOLLOWING PARTS FOR

OX5

New cylinders, $25.00. Used cylinders, New upper cases, $130.00. Oversize valves fitted, $12.50. New carburetors, $47.50. Used OX5 Engines. Priced according to condition. All new parts guaranteed perfect.

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For Sale: Exceptional location at Rochester, New York, five miles from center of city on improved road. Sixty acres; large barn suitable for hangar. Would make an ideal location for school or commercial port.

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ACETATE DOPE $100 for 110 gals. in steel drum; quality guaranteed; repeat orders from all over country.

AERIAL CAMERAS Eastman Hawkeye, L Type; 4x5 plates, 2 magazines, 24 plates each. NOT a hand camera. Original cost, $600; my price, $150 with accessories and lenses.

HENRY K. FORT
Widener Bldg. Philadelphia, Pa.

THE DETROIT AERO MOTORS CO.
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One set of new production OX5 exhaust pipes, guaranteed not to burn out, complete with elbows **$16.00**

AEROTECH, Inc.

Aeronautical Engineering Design, Stress Analysis, Reports, Appraisals. Complete Testing Facilities.

Moline, Illinois

Funny how this little advertisement happened to attract your attention too, isn't it?

Just as you have read it, thousands of others will have read it also. This is the best proof we can offer that advertisements here attract the attention of those who have something to buy or sell.

CLASSIFIED ADVERTISEMENTS

"The Clearing House of the Aircraft Industry"

Rate 10c per word; $2.50 minimum. Payable in advance. Replies addressed to Box Numbers forwarded promptly.

FOR SALE: Pair new U. S. A. 35-A design high-lift monoplane wings; 5-foot chord, 32-foot span; uncovered. Weight, 240 pounds. Price, $100. Will trade. Arthur Finch, Maysville, Ky.

FOR SALE: One new 220 H.P. Hispano-Suiza—French make; one new 80 H.P. air-cooled Renault—both in original crates; attractively priced. Immediate delivery f.o.b. N. Y. City. Brownback Motor Labs., Inc., Dept. S.B., 1038 Graybar Bldg., New York City.

FOR SALE: Latest model Ryan Brougham; less than 50 hours on motor. Best offer takes ship. Box 707, AERO DIGEST.

FOR SALE: Sikorsky-Travel Air OX-5 monoplane. Will outperform any ship powered with OX. Ship and motor has been used only 60 hours. Bargain for quick sale. Can be seen at Air Associates hangar, Curtiss Field. J. R. James, Albany Airport, Albany, N. Y.

FOR SALE: New OX-5 in original crate. Best offer takes it. Iron Products Corp., La Crosse, Wis.

ONE LIBERTY Engined Dusting Airplane, practically new. Can be converted to cargo or passenger service. Will sell reasonably, with or without engine. KEYSTONE AIRCRAFT CORPORATION, Bristol, Pa.

ONE PAIR Mahogany Twin Floats, excellent condition. Total displacement, 4300 lbs. Price, $200 (less struts), crated for shipment. KEYSTONE AIRCRAFT CORPORATION, Bristol, Pa.

UO Main and Wing Tip Floats, complete, 25 hours. Reasonable. KEYSTONE AIRCRAFT CORPORATION, Bristol, Pa.

WANTED: Used motors, 23-80 H.P. rotary, fixed, vertical. Good running condition, complete with props, mountings. Priced reasonable. Compasses, altimeters, gauges, 20x4 wheels. Box 705, AERO DIGEST.

BARGAIN: New OX Swallow. Perfect in every detail. Forty hours service. Motor turns above fourteen hundred. DH wheels. Will sacrifice for immediate sale. C. O. HAMBLETON, Box 201, Woodward, Okla.

PILOT who is licensed airplane and engine mechanic, much cross-country and barnstorming experience, wishes flying job and will fly for salary or commission. Box 702, AERO DIGEST.

FOR SALE: Standard clipped-wing, $200, with OX5 motor, $600. Both motor and plane had only 50 hours. M. L. Cunningham, Dayton, Pa.

PRIVATE party desires purchase elementary electrical or ground aviation Home Study course with copyrights. Box 706, AERO DIGEST.

FOR SALE: A practically new Ryan Brougham sistership to the "Spirit of St. Louis." Used as a demonstrator and kept in perfect condition. A real bargain at $9500. Capital Airways, 5315 Colorado Ave., N. W., Washington, D. C.

CALCULATIONS and designs of modern all metal airplane. First class, can be made for low price. Box 703, AERO DIGEST.

FOR SALE: Gnome motor, complete, with propeller. Run 5 hours, crated for shipment. H. E. KALLUSCH, 605 Temple Bldg., Rochester, N. Y.

WRIGHT STANDARD, model A Hisso turns 1450 in blocks, 1600 in the air. (Completely rebuilt.) New covering (Flightex). Duco, white. Flys hands off. D. H. landing gear, 8 in. tires. Vought radiator. Eighty gals. gas, wind gas pump to gravity feed. Steel motor mount, 7 gal. oil tank, cooled. Dual control. No crack ups and all covered parts guaranteed. $2750. Dick, 6526 Telegraph Ave., Oakland, Calif.

FOR SALE: 3 place Hisso Standard. First class condition, new covering, Department of Commerce license. With or without motor. MASSACHUSETTS AIRWAYS CORP., 1597 Main Street, Springfield, Mass.

YOUNG MEN wanted at every Airport to sell the AUTO-PLANE to automobile owners. A fast selling metal airplane novelty that flys. Excellent profits. For details write Wright Mfg. Co., 47 So. 12th Ave., Mt. Vernon, N. Y.

FOR SALE: New single place Meteorplane, complete, without motor. Must sell at once for $375. Box 710, AERO DIGEST.

VETERAN FLIERS wish financial backing for non-stop flight around world via 16,000 mile route. Have everything planned with suitable equipment and maximum safety assured. Box 709, AERO DIGEST.

FOR SALE: OX5 Thomas Morse Scout, new covering, kept in hangar, motor in A-1 condition, ready to fly. BURK AUTO REPAIR, Muskogee, Oklahoma.

BUILDER with demonstrated ability to produce commercial airplanes profitably wants $100,000 capital to start new concern. Box 704, AERO DIGEST.

SINGLE MAN, 24, wants position with reliable aircraft company or motor manufacturer. Flying, mechanical and business experience, capable of office management or sales. Willing worker. Best of references. Box 713, AERO DIGEST.

OX5 and JN parts cheap. Five OX5's, one OXX6, very good condition, cheap. Must be seen at Bernard Airport to be appreciated. Canuck also sacrificed at $500, less motor; $1000 complete. Reason for selling, am with Barnard Air Lines, Youngstown, Ohio. WM. D. SMITH, Bernard Air Lines, P. O. Box 31, Youngstown, Ohio.

YOUNG MAN, age 19, desires position of any kind at an airport. Graduate of Aviation Institute of U. S. A., 10 hours flying. Will go any place. Joseph Wadsworth, Jefferson, Mass.

YOUNG MAN, 20, with 10 hours' flying experience, desires position; anything to get flying experience. A-1 character, worker and references. Will go anywhere. Box 714, AERO DIGEST.

WANTED: Used OX-5 motors or parts. Also OX-5 crank cases and OXX-6 crank cases. Box 632, AERO DIGEST.

JUST OUT—Booklet and blue prints on design, construction and operation of small sport planes, includes lessons in flying, all for $1.00. CHAS. E. RUSSELL, 545 Stadium Drive, Ft. Wayne, Ind.

HERE'S YOUR CHANCE to learn to fly. Seven hours of instruction guaranteed for only $30. Send stamp for particulars. CAPT. E. S. ANDERSON, Chatsworth, Ga.

FOR SALE: Used American Eagle Airplane, 1927 model, with OX5 motor. Excellent condition. Price, $1900; less motor, $1500. AMERICAN EAGLE AIRCRAFT CORPORATION, Kansas City, Mo.

NEW Lawrance 2 cylinder, 23 h.p. with propeller $150. Gnome 50 h.p., $100. Gnome 100 h.p., $50. Pusher propeller, $25. Tractor propellers, $20. OX5 toothpicks, $30. Wings for airplanes and gliders, $5 each; crating, $2. Goggles, 50 cents each. White helmets, $1.25 each. MARVIN A. NORTHROP, 730 Washington Ave., North, Minneapolis, Minn.

INVENTIONS COMMERCIALIZED. Patented or unpatented. Write ADAM FISHER MANUFACTURING COMPANY, 563 Enright Street, St. Louis, Mo

PARACHUTES, new and used, for ships of all types, rope ladders for stunt men, etc. Specify weight. Established 1903. THOMPSON BROS. BALLOON CO., Aurora, Ill.

FOR SALE: Waco 10; bought June 22nd; 11 actual hours; OX5 turning 1475. For particulars, N. Y. & N. J. AIR TRANSPORT, 78 Bay 20th St., Brooklyn, N. Y.

CAPITAL WANTED. The active head of an airplane manufacturing company and designer of its planes wants to meet a small group of men amply able to finance and control a new company. Have complete data on costs, equipment, designs, etc. Principals only. Box 708, AERO DIGEST.

WACO 9 WINGS and ailerons. Custom built with steel spar ends required by Department of Commerce. 18 inch walk on lower wings. Special Waco repair rib easy to install over top of spars. All wing repair parts in stock. Prices on request. LUDINGTON PHILADELPHIA FLYING SERVICE, Philadelphia Airport, Philadelphia, Pa.

FOR SALE: Shepherd screw cutting lathe, 7"x24", with complete equipment, $65. One Boynton traveling head shaper with back gear, $70. Both in good working condition. Sensenich Bros., Lititz, Pennsylvania.

FOR SALE: OX5 Standard; Jenny less motor, 1 Hisso bed, extra Jenny wings. Both planes in good condition. R. V. ZIMMER, Warsaw, Ind.

FOR SALE: Waco 9, like new; motor, plane, 1400; Hartzell propeller, dual control. Motor has 11 hours since overhaul. Price, $1650. MICHAEL GONDYK, 354 - 21st Street, Brooklyn, N. Y. Phone South 10377.

BRAND NEW LINCOLN PAGE and nearly new Travel Air equipped with completely Millerized motors. Wonderful buys. Write MILLER AIRPLANE PRODUCTS, 3827 West Jefferson, Los Angeles, Calif.

FOR SALE: 1928 model OX5 Waco Ten, perfect condition throughout, $2250. OXX6 Eaglerock in perfect condition throughout, beautiful job, $2000. Also two short wing Standard J-1's with overhauled OX5 engine, new covering, excellent condition, $1100 each. Wire or write HARRY HORNER, 78 West Porter St., Marshall, Mo.

FREE INSTRUCTION on any new or used Waco purchased from us during the month of October. Our bargains in used jobs must be seen to be appreciated. Let our licensed service men take care of your repair jobs. When it's flying—it's Robbins. Wire, phone, write Robbins Flying Service, Akron, Ohio.

MODEL PLANES, supplies. Send dime for propeller and price list. Aero Clubs given special rates. Agents' commission 50%. Information, 10c. MODEL AIRPLANE CO., 161 Royal Avenue, Hawthorne, N. J.

ADVERTISING MANAGER—writer of human interest advertising copy, mail order experience, creator of distinctive folders, booklets, circulars, catalogs. Excellent correspondent. 31, Married. Box 711 AERO DIGEST.

SMALL, compact organization of aeronautical engineers and practical men willing to develop new project having commercial possibilities. Available soon. Box 712, AERO DIGEST.

FOR SALE: New Waco Ten; Government License; flown about thirty-five hours. OX 5 motor, silchrome valves. Motor perfect, turns fourteen fifty. Price, $2250. Jos. W. Bonen, Box 28, Escanaba, Michigan.

WACO 10, Hammondsport motor, large wheels, Hamilton prop., only 6 hours, perfect condition, $2600. Travel Air demonstrator, DH wheels, duals, like new, $2750. Monocoupe demonstrator, like new, $2100. Planes guaranteed as represented. Roth-Downs Airways, distributors, 2512 University, St. Paul, Minn.

SITUATION WANTED: Pilot, executive, college man, thirty-three, Government and commercial experience would like to represent aeronautical company in Washington. Mr. Towner, Cavanaugh Courts, Washington, D. C.

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"I never found any town in any country where Mobiloil could not be obtained in sealed tins"



thus writes Mr. Ivor McClure after a pleasure tour from Croydon to Constantinople and return.

This map traces the course followed by Mr. Ivor McClure during his recent air tour from Croydon to Constantinople.

THE VACUUM OIL CO. LTD.,
Westminster, S. W. 1. 16 North Court.
1st June 1926 Wood Street.
Westminster.

Dear Sirs,

I wish to express my keen appreciation of the service given by your company. On my flight across Europe to Constantinople and back by another route I never once failed to find the correct grade of your oil for my Cirrus engine. Even still more important, I found your oil on every aerodrome where I stopped. The delay that was saved by this where aerodromes are often an hour away by road from the town they are supposed to serve was immense.

On my previous journey last August half round Europe in my Moth, I never found any town in any country where Mobiloil could not be obtained in sealed tins.

In view of some of the doubtful foreign brands on the market, the ability to obtain everywhere a good oil of proved quality is of the highest importance to foreign aerial travel. The wide distribution of Mobiloil and the good organization of the Company is a very valuable service to Aviation; with many others, I have every reason to be grateful for it.

Yours faithfully,
(Signed) IVOR McCLURE.

GARGOYLE
Mobiloil

Look for the red Gargoyle trade-mark on the Mobiloil container

TRULY remarkable evidence of Mobiloil's world-wide distribution and use by pilots the world over, is this matter-of-fact statement from a private individual. His was no stunt flight with elaborate preparations, but a leisurely pleasure trip in his own D. H. "Moth" plane.

There is no "beaten track" in the air. Mr. McClure flew from England to Turkey over the more frequented air route through Frankfurt, Vienna and Belgrade. The return trip covered Roumania, Poland, and Northern Germany, over country not so generally well-provided for servicing airplanes. Stops were made at the larger, well-equipped airports where possible, but it was often necessary to land at emergency fields in between.

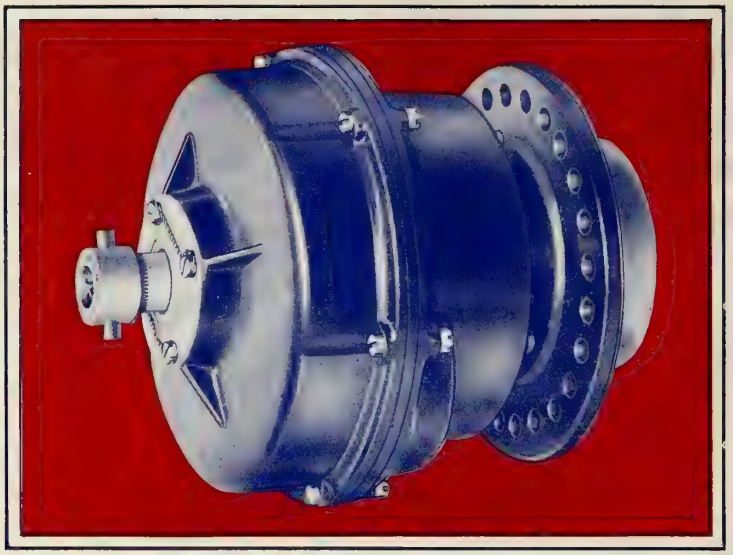
At several of these, Mr. McClure had difficulty in getting gas, but nowhere did he fail to find his particular grade of Gargoyle Mobiloil on sale at the field.

As this English flier expresses it, "the ability to obtain everywhere a good oil of proved quality" is the reason for Mobiloil's outstanding preference among aviators the world over. You are always sure with

The World's Quality Oil

Mobiloil

VACUUM OIL COMPANY



ECLIPSE SERIES 16

HAND INERTIA STARTER

for Cockpit Cranking

THE convenience of cockpit cranking is added to the safety and dependability of starting in the Eclipse Series 16 Hand Inertia Starter.

With this starter, strictly *one-man starting* is assured.

even under the most unfavorable conditions. The Series 16 Hand Inertia Starter operates on the same principle used in all Eclipse Inertia Starters.

Full details will be furnished upon request.

ECLIPSE MACHINE COMPANY
East Orange
Eclipse Machine Co., Elmira, New York

EAST ORANGE PLANT
New Jersey
Eclipse Machine Co., Ltd., Walkerville, Ont.

ECLIPSE

AVIATION ENGINE STARTERS AND GENERATORS

ol. 13 No. 5 NOVEMBER 1928 25 Cents

AERO DIGEST

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ANTARCTIC EXPEDITIONS

A New Leader in the Aeronautic Industry



THE marked success of "Hercules" drills, reamers and cutters in virtually every metal-working industry is reflected in the wide-spread use of these tools in the aeronautic industry.

Production men, recalling the absolute dependability, accuracy and assured economy of these tools, have introduced them into aeroplane and aeroplane engine manufacturing plants throughout the country.

Here, they are establishing records in performance.

Just as "Hercules" leads in other industries, so it has assumed leadership among aeronautical manufacturers.

WHITMAN BARNES-DETROIT CORPORATION

Manufacturers of
TWIST DRILLS · REAMERS · CUTTERS
END MILLS · COUNTER BORES · ETC.

W-B-D TRADE MARK

Canadian Factory
CANADIAN DETROIT TWIST DRILL
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New York · · · DETROIT · · · *Chicago*

AERO DIGEST, *November, 1928. Published every month. Volume 13, Number 5. Publication office, 220 West 42nd Street, New York, N. Y. Subscription price $3.00 a year, single copies, 25 cents; foreign subscriptions, $4.00. Entered as second-class matter July 17, 1922, at the Post Office at New York, N. Y., under the Act of April 3, 1879.* *Copyrighted, 1928, by Aeronautical Digest Publishing Corporation.*



The World Over...

GOVERNMENTAL

United States Army
United States Navy
U.S. Department of Commerce
U.S. Department of Agriculture
Imperial Japanese Army
Department of National Defense, Canada
Royal Canadian Air Forces

INDUSTRIAL

Des Moines Register-Tribune, Des Moines, Iowa
Newspaper advertising, publicity and distribution

Wadhams Oil Company, Milwaukee, Wisconsin
Advertising and publicity

B.F.Goodrich Rubber Company, Akron, Ohio, *Transportation of executives, sales promotion advertising and publicity*

John Bailes & Son, Toronto, Canada, *Mining and mineral exploration*

Bell Telephone Company, New York, *Experimentation and research in aerial transmission and receiving*

The Aero Club of Tucuman, Buenos Aires, Argentine
Aeronautical education and aviation school purposes

Brock & Weymouth, Philadelphia, *Aerial surveys and photography*

Lloyd M. Long, Dallas, Texas
Aerial surveys and photography

TRANSPORT OPERATION

Colonial Air Transport, Inc.
New York–Hartford–Boston

Canadian Colonial Airways, Inc.
New York–Albany–Montreal

Colonial Western Airways, Inc.
Albany–Schenectady–Utica–Syracuse–Rochester–Buffalo–Cleveland

Clifford Ball, *Cleveland–Indianapolis–Cincinnati*

Pan-American Airways, Inc.
Key West – Havana – Santa Clara–Camaguey–Santiago de Cuba

Mid-Plane Sales & Transit Co., *Fargo – St. Paul*

West Indian Aerial Express, *San Juan–Santo Domingo–Port au Prince–Santiago de Cuba*

Western Canada Airways, Ltd.
Vancouver–Victoria–Seattle

Compania Mexicana de Aviacion, S.A., *Mexico City–Tampico – Tuxpan – Brownsville*

Pitcairn Aviation, Inc.
New Brunswick–Philadelphia – Washington – Richmond – Greensboro – Spartanburg – Atlanta

Canadian Transcontinental Airways, Ltd., *Grand Mere–Toronto – Montreal*

The Embry-Riddle Company
Chicago–Indianapolis–Cincinnati

Peruvian Airways, Inc.
Lima, Peru – Talara, Peru

TAXI SERVICE

American Aircraft Corporation, *Los Angeles, California*

Howard Brown, *Salt Lake City, Utah*

California Air Service, *Redlands, California*

Central New York Airways, Inc., *Norwich, N. Y.*

Campbell-DeSchepper Airplane Co., *Moline, Illinois*

Cardinal Flyers, Inc., *Louisville, Kentucky*

Chesapeake Aircraft Company, *Baltimore, Maryland*

Clyde Shockley, *Kokomo, Ind.*

Corporacion de Aviacion de Cuba, *Havana, Cuba*

Curtiss Flying Service, Inc. *Mineola, L. I., N. Y.*

Dennison Airport Corp., *Boston, Mass.*

Dungan-Smith Airways, Inc. *Cleveland, Ohio*

Fairchild Aviation Corporation, *Chicago, Ill.*

Ludington Exhibition Company, *Philadelphia, Pa.*

Merced-Wawona Air Lines, *Merced, California*

Michigan Air Transport Co., Inc., *Grand Rapids, Michigan*

United Air Lines, *Chicago, Ill.*

Pacific Coast Air Service, *Oakland, Cal.*

Wings, Inc., *Dearborn, Michigan*

Potomac Flying Service, *Washington, D. C.*

Weeks Aircraft Corporation, *Milwaukee, Wisconsin*

Rogers Air Lines, Inc., *Miami, Florida*

Scenic Airways, Inc., *Chicago, Illinois*

Western Canadian Airways, *Winnipeg, Canada*

EXPEDITIONARY

Byrd Antarctic Expedition to explore the reaches of the South Pole in the "Stars and Stripes."

Record globe-circling trip of John Henry Meers and C. B. D Collyer — around the world in twenty-three days in the "City of New York."

United States Department of Agriculture "sugar" expedition over previously unexplored regions of New Guinea.

Geological surveys made by the Northern Aerial Minerals Expedition in otherwise inaccessible districts of Canada for the purpose of developing new mining resources.

Rescue expedition of the trans-Atlantic Bremen flyers at Greenly Island.

FAIRCHILD



The man who tunes the plane

Both Are Trained at









All photos taken at Parks Air College.

With over a hundred airplane factories in the United States and over 1200 airports, transport lines and dealers, where are the trained men coming from? We have promised to furnish 200 men to *one factory alone!* Do you want one of these jobs?

It costs no more to get your training in the largest and most elaborately equipped Air School in the world. In fact it costs *less* to be thoroughly trained than poorly trained.

In the Airplane and Engine Mechanics Division of the Parks Air College, you are trained by experts. In the motor section we have Whirlwind, Velie, OX5, Liberty, Hispano, Caminez, and other famous engines. You tear these down, overhaul, rebuild, and test them!

In the airplane division you build up airplanes piece by piece—work on various makes of modern airplanes—build up complete new ships. You learn factory production methods, get line duty on the flying line servicing small and large planes. You are trained under active factory and airport conditions. The Parks job-way system trains you as you must be trained for success.

New factories, airports, airlines, dealers and associates are opening up *daily*. Parks training as an airplane and engine mechanic will qualify you for a *good* position that leads to salaries of $75 to $150 per week.

You can start your training the day you reach St. Louis and finish this great Airplane and Engine Mechanics Course in four months' time.

While you are in school you can live in one of our Dormitories, right on Parks Airport, eat in the Airport restaurant. There is a recreation room, with reading and writing facilities, radio, and phonograph for your entertainment.

SPECIAL RATE

Right now, in order to provide mechanics for the new factory building on Parks Airport, we have a special low rate for the Airplane and Engine Mechanics' Course. Send the coupon on the opposite page immediately for our big 32 page catalog "Skyward Ho!" which gives complete information about Parks Airport, all our courses, and opportunities for graduates.

Don't let this opportunity slip by! Write at once!

Pictures at the left show, from top to bottom. Servicing a Cabin Monoplane. Building up a steel tube fuselage. Students building a new wing, and at bottom, overhauling a Waco.

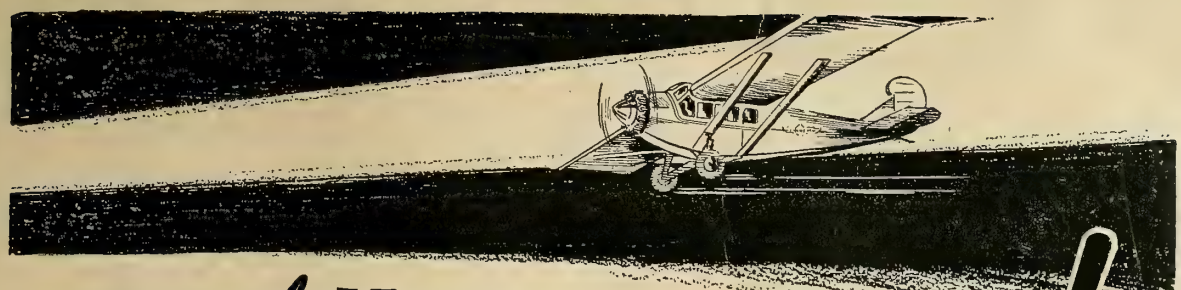
Pictures on the opposite page show the Administration Building and two training planes.

PARKS Air

202-H Missouri Theatre Bldg.

The Largest Civilian Air





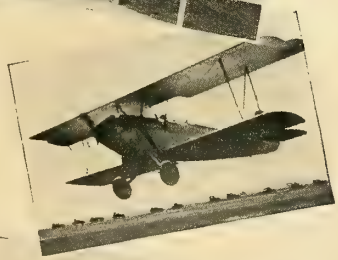
...and the man who rides the skies!

Parks Air College!

The future of the air is boundless and unlimited—but what about *your* future? Right now there is an acute and growing shortage of good pilots. A career of thrilling work can be yours after flying instruction at Parks Air College—big pay, a safe future and perhaps a fortune!

One organization alone has agreed to take 200 of our pilots by spring if we can supply them. Why don't *you* get one of these jobs?







All photos taken at Parks Air College.

The photos on these pages give you only a few glimpses of Parks Air College. We have 26 training planes, over $165,000 worth of training equipment, our own modern airport, hangars, classrooms, dormitories, etc.

All our pilots are licensed transport pilots, carefully selected. You will like every one of them.

Thorough Instruction

To be a qualified pilot you must be taught straight flying, acrobatics, forced landings, vertical banks, spins, cross-wind landings, cross country flying, 90 degree, 180 degree and 360 degree landings and many other flight maneuvers.

But to pass the strict Government examination you must also know aerial navigation, aeronautical meteorology, aerodynamics; be familiar with modern aircraft engines, and be able to rig, overhaul and adjust airplanes!

All this training is given in our great Pilots' Ground Course which takes two months to complete.

No wonder students have come to Parks Air College from every state in the Union and from several foreign countries!

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If you are ambitious to become a real flyer—to become a nationally known figure—then choose Parks! Send at once for "Skyward Ho!" that gives full information about *all* our courses, pictures of Parks Airport, and details of a special limited offer that will save you over a hundred dollars!

If you are serious about your future in the sky, send the coupon for a free copy of the most interesting and inspiring book you have ever read. Send *now!*



COLLEGE inc.

Saint Louis, Missouri

School in America

Who will be the great pilots, the transport engineers, the airline owners of tomorrow? Many of them will be men who send the coupon today for "Skyward Ho!".

PARKS AIR COLLEGE, Inc.,
202-H Mo. Theatre Bldg., St. Louis, Mo.

Send me "Skyward Ho!", describing and illustrating your Pilots' and Mechanics' Courses, with special offer saving me over $100.

Name .....

Address .....

FIRE



5 SECONDS LATER!

OUT

Fire is a menace that should be guarded against. The majority of planes in Europe are equipped with the PHYLAX AUTOMATIC EXTINGUISHER. One—Two! Fire! Out! in five seconds.

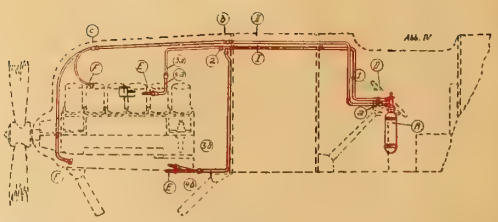
PHYLAX

This Extinguisher for air or water-cooled motors consists of a central chemical tank with pipes leading to seven different points in the plane where fire is apt to occur. Heat produced by flames automatically releases the charge throughout the ship, extinguishing the flames instantly.

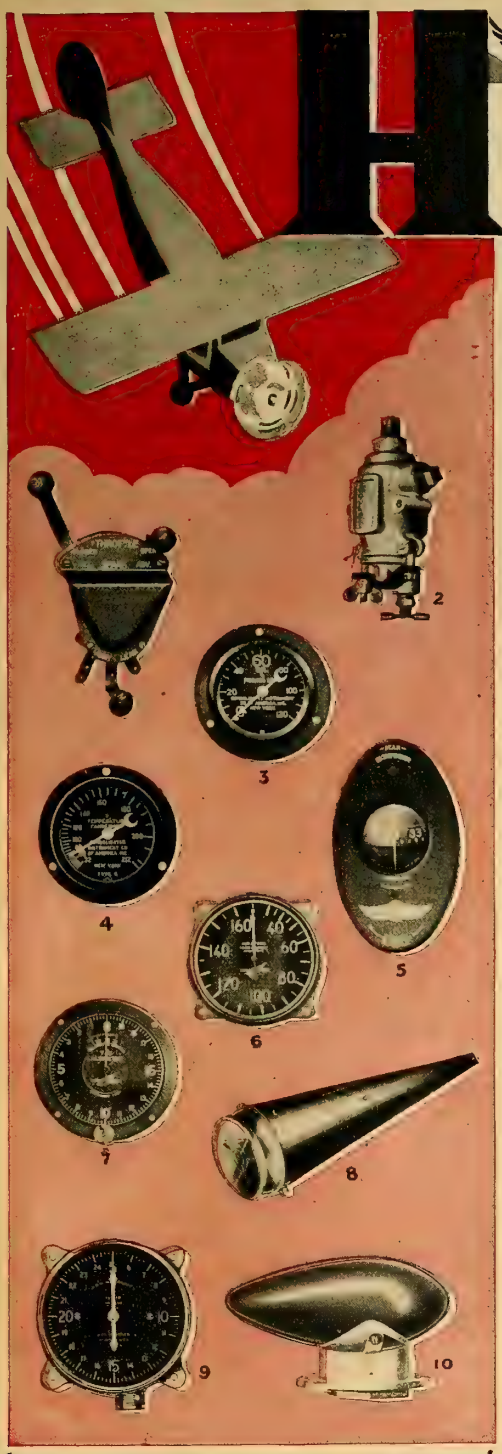
The PHYLAX furnished complete, ready for installation—$60.00. We are the sole distributors for North America.

COMMAND-AIRE, INC.
Little Rock, Ark.





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B Valve Container
C Electric Clamps
D Release Shell
E Fuses
F Sprinkler Heads
I Fuse Lines
II Sprinkler Lines
a Union Nut
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c Y Branch Union
1 Union Nut
2 T Piece
3a & 3b Nipples
4a & 4b Double Fuse Arms



'STEADY NERVES *of the* PLANE'

HIGH up among turbulent clouds a night pilot is riding out a storm . . . In the emergency his steel-like nerves are tense yet steady . . . for his Consolidated Instruments, functioning with equal sureness as the steady nerves of the plane, are safely guiding him to his port.

Consolidated Instruments are rightly termed "steady nerves of the plane." No matter what the flying emergency may be, they triumphantly hold true and meet every demand made by plane and pilot.

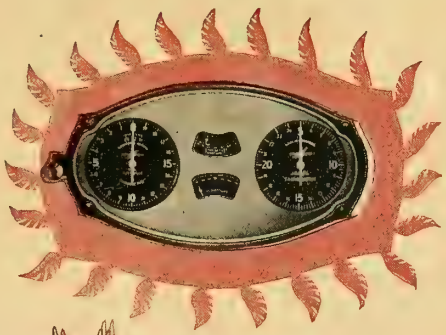
Consolidated Instruments perform accurately because they are built with expert care and precision from the highest grade materials.

The fact that 95% of the commercial aircraft in the United States are equipped with Consolidated Instruments, singly or in sets, is proof of their steadfast accuracy in performance.

Address Dept. A for illustrated booklet and complete information regarding Consolidated precision-built instruments

The instruments shown are as follows:

1. Engine Control
2. Fuel Strainer
3. Oil Pressure Gauge
4. Temperature Gauge
5. Star Pathfinder Compass
6. Air Speed Indicator
7. Altimeter
8. Landing Lights
9. Jones Tachometer
10. Running Lights



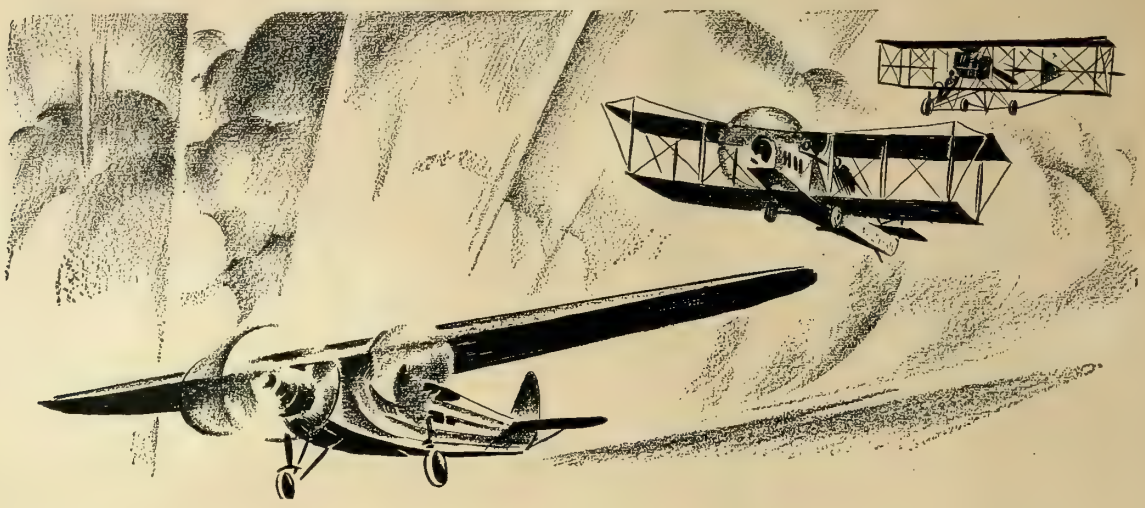
TYPE "A" PANEL

CONSOLIDATED INSTRUMENTS

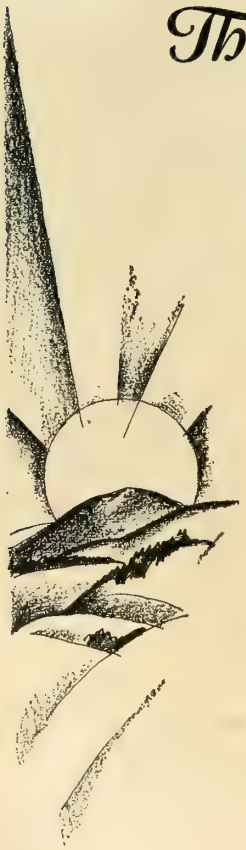
CONSOLIDATED INSTRUMENT CO. OF AMERICA, Inc.
41 East 42nd Street, New York City

Western Representative
M. E. HULSE, 5391 Broadway, Oakland, Calif.

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AVIATION history moves speedily. Gone already is the day of the "boxy", square-rigged biplane that pioneered the airways, it seems, only *yesterday* . . .

Now, fleet-winged giants drone overhead . . . the Lindberghs, the Byrds, the Chamberlins . . . coaxing their Whirlwinds to new glory and . . . *accomplishment.*

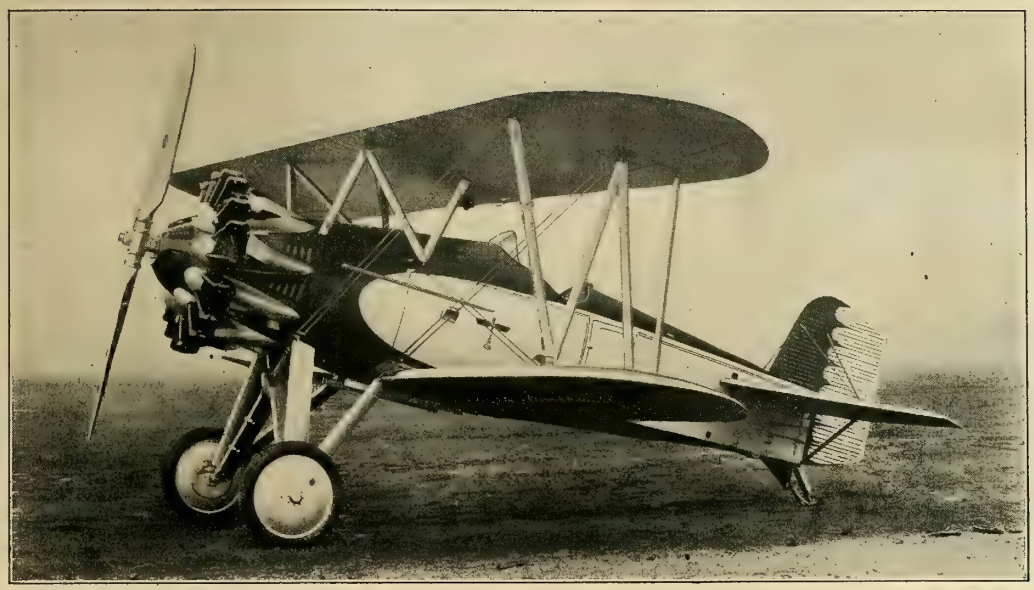
And with them, setting the pace, is . . . VALSPAR! Today, as in the day of Orville Wright, Valspar stands supreme. Supreme for its durability, waterproofness, protection from vibration, weather, oil and gasoline.

Valspar and the modern all-lacquer finish, *Nitro*-Valspar, are supreme also for beauty and color! Those beautiful color effects which are becoming so increasingly popular are created with Nitro-Valspar.

As usual Valspar anticipates the trend of the times and is ready with COLOR and a Color Service that helps solve your finishing problems.

VALENTINE'S
VALSPAR
The Varnish That Won't Turn White

VALENTINE & COMPANY
386 Fourth Avenue
New York
W. P. Fuller & Co., Pacific Coast



An Outstanding Triumph

THIS single-seater fighter—the latest Boeing achievement in military aircraft—won the free-for-all high speed contest against all other types in its class at the 1928 National Air Races and Aeronautical Exposition. Climbing from a standing start to a height of 10,000 feet and returning in 5½ minutes, it again outclassed all competition, and is credited by aeronautical authorities as an outstanding triumph in airplane design and construction.

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Boeing success has been founded on the development of military aircraft. Our commercial products today incorporate the experience in design and skill in workmanship acquired in developing high-speed fighting equipment for the United States Army and Navy Air Services—all of which is now reflected in the Boeing airplanes made available to the flying public.

Boeing Airplane Co.

Seattle, Washington

Mail by Air and Speed It There

BA61

Say you saw it in AERO DIGEST



LIKE AN OLD FRIEND

WHEN you "set her down" for gas and oil, what a satisfaction to find Phillips Aviation Service equipment waiting your command.

Here's a gasoline especially adapted to high compression Radial engines. Its characteristics include: *Less weight per gallon, More engine revolutions per minute, More economical operation, More power*—all because of BETTER DISTRIBUTION—*no overly rich cylinders below, no lean cylinders above.*

Phillips Aviation gasoline is used by leading air mail contractors such as the Boeing Air Transport, Inc., Robertson Aircraft Corporation, The National Parks Air Lines and Western Air Express.

Now available at Chicago, St. Louis, Rockford, Clinton, Des Moines, Iowa City, Omaha, North Platte, Cheyenne, Rock Springs, Salt Lake, Wichita, Bartlesville, Amarillo, and many other air ports.



Phillips Petroleum Company

BARTLESVILLE, OKLAHOMA

NATURAL GASOLINE FOR CONTROLLED VOLATILITY

Phillips Aviation



AC in the National Air Tour

AC SPARK PLUGS again proved their supremacy in aviation when seventeen of the twenty-four flyers who finished in the 6,200-mile air-reliability contest for the Edsel Ford Trophy chose AC's for their equipment, and rolled up the amazing total of 282,317 points as against 88,938 for all other spark plugs.

Hawkes, Page, Myers, Stinson, Lowers, Braun, Henley, Brock, Breese, Meister and the other aces of this aerial derby realized, as did Col. Lindbergh, Chamberlin, Byrd, Maitland and the other leaders who have made air history, that the AC's stand up under all conditions and serve faithfully and consistently under the most trying tests.

AC-SPHINX
Birmingham
ENGLAND

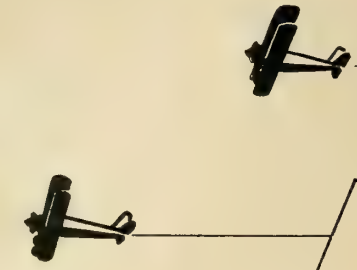
AC Spark Plug Company
FLINT, *Michigan*

AC-TITAN
Clichy (Seine)
FRANCE

AC SPARK PLUGS AC SPEEDOMETERS AC AIR CLEANERS AC OIL FILTERS AC FUEL PUMPS
AC GASOLINE STRAINERS AC AMMETERS AC OIL GAUGES AC THERMO GAUGES

© 1928, AC Spark Plug Co.

Say you saw it in AERO DIGEST



R. C. DURANT
ROSCOMMON, MICHIGAN

July 16th, 1928

Messrs. Stearman & Schaefer,
Stearman Aircraft Company,
Wichita, Kansas.

Gentlemen:

I want to congratulate you and your company on the splendid ship you are building, and let you know how pleased I am with my recent purchase.

Needless to say, if I were not absolutely convinced that the Stearman is one of the best built and best performing ships under all conditions that I have ever owned, I would not have placed an additional order for the finest plane you can build, equipped with the latest and best of navigation instruments.

Please advise me when you will be able to make delivery of same.

Anticipating meeting you both when I come for delivery of the ship, I am,

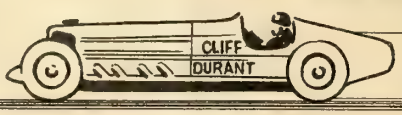
Very sincerely yours,

R. C. Durant

STEARMAN AIRCRAFT COMPANY
WICHITA, KANSAS



THE STEARMAN C-3-B





FREEDOM FROM NEEDLESS WEIGHT IS A MAGIC CARPET

The magic carpet finds its modern parallel in the recent application of Aluminum and its alloys to the science of aviation.

This marvelous metal is helping to bring the airways of the world into the safety zone . . . and has given to the aircraft industry a new and more practical dimension.

Today, thousands of sturdy ships are sailing over land and sea, carrying men and women on errands of business or pleasure, carrying merchandise and mail . . . carrying the pursuit of science and discovery to the remotest parts of the earth.

Carrying them with a safety and comfort undreamed of—even five years ago. For aircraft parts that were previously made of wood—moisture-absorbing, susceptible to warping, inflammable, easily shattered, have been replaced by Aluminum Alloys of measured tempers and toughness. Heavy cast iron parts, with their useless toll of dead weight, have given way to heat-treated Aluminum Alloys—stronger, less than half as heavy.

The widespread use of Aluminum and its alloys in aircraft construction has come with great suddenness.

But behind the rapidity of its actual adoption lie years of patient work—of experimentation and development.

Aluminum Company of America, the world's foremost authority on Aluminum and its alloys, offers you today not only the metal in its various forms but a thorough technical experience in its use.



The strong Aluminum Alloys produced by Aluminum Company of America retain the low specific gravity characteristic of commercially pure Aluminum.

Yet they have tensile strengths ranging from 14,000 lbs. per square inch to 70,000 lbs. per square inch.

The alloys within this range are designated by name and fall within fixed areas of Tensile Strength, Yield Point and Elongation.

The variation in their treatment and temper and their consequent wide range of mechanical properties make it possible for Aluminum Company of America to present an Aluminum Alloy exactly suited for practically every aircraft part.

Complete metallurgical engineering and technical information concerning every form of Aluminum for aircraft, together with its fabricated uses, will be furnished upon request.

ALUMINUM COMPANY OF AMERICA

2484 Oliver Building, Pittsburgh, Pa.

Aluminum in Every Commercial Form Offices in 19 Principal American Cities

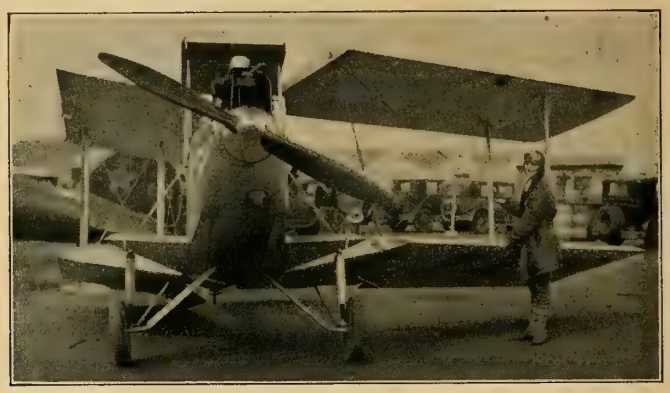
ALUMINUM AND ITS ALLOYS *for Aircraft*

"FOR ALL THE U. S.!" at last—

AVRO AVIAN

with
HANDLEY - PAGE Slotted Wings
by special arrangement

The famous AVIAN made promptly available to American fliers by AIR ASSOCIATES, Inc.



Miss Susanne Bennett, fiancee of Sir Hubert Wilkens, famous pilot-explorer, like Lady Heath and Miss Amelia Earhart, chooses the AVIAN.

"IF YOU CAN DRIVE A CAR... you can fly this ship!" ..... Bill Brock

Easy to handle, economical and **SAFE**, it has wiped out even women's prejudice against flying.

Bert Hinkler flew his AVIAN solo from England to Australia.
Lady Heath flew her AVIAN solo from South Africa to England.
Miss Earhart flew her AVIAN solo from New York to Los Angeles.

The new AVRO-AVIAN, for all-American distribution, is equipped with the new Mark III CIRRUS 4-cylinder-in-line, air-cooled engine, 95 H.P., an improved under-carriage, folding wings and —

The Handley-Page Slotted Wings That Have Saved Many Lives.

Fly-away delivery at two weeks notice, Curtiss Field or nearest agent.

Dealer territories are rapidly being closed by

AIR ASSOCIATES, Inc.

Curtiss Field **NEW YORK** **535 5th Ave.**

American representatives of A. V. Roe & Co., Ltd., Manchester, England

SAFETY



RING TRUE
BOHN
BEARINGS

Used on all the
AMERICAN
Trans-Pacific
Trans-Atlantic
Polar and
around-the
world flights



Aircraft Division
BOHN ALUMINUM & BRASS CORP.
Detroit - - - Michigan
Also makers of Bohnalite Castings



Through the rain and hail and snow The Air Mail has got to go.

FIT COMPANIONS

For The Silent Courier of The Night

High and steady on his course the mail pilot speeds from New York to Atlanta . . . down the line to Philadelphia and Washington and over the hills of Virginia, the Carolinas to Georgia . . . his companions in flight the Pitcairn Super Mailwing and Naturaline the super aviation fuel.

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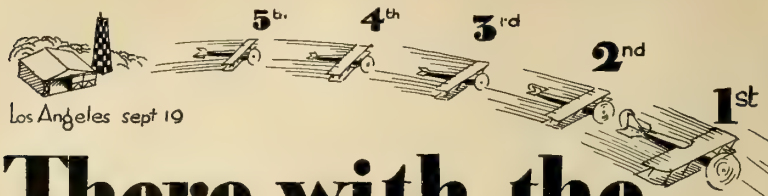
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Cincinnati air race of 1928 class A

There with the *first five*-no less



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Gentlemen:-

I want to take this opportunity of again complimenting you on the worth of your splendid "Kendall" oil.

As you know I used this oil exclusively in the Los Angeles to Cincinnati Air Derby last month, and feel that it played a very important part in winning this race, Kendall oil is not new to me, as I have used it for a number of years, in various types of motors, and always with the same wonderful results.

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It is a pleasure to know and use an oil that is so dependable.

Very truly yours, Robert E. Dake

Pittsburgh, Pa.
October, 1, 1928.

Again

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IN the Los Angeles to Cincinnati Airace of 1928, nineteen planes started in class A from Mines Field on September 19. Nine of them fought their way under highly unfavorable weather conditions to the finish at Lunken Airport, Cincinnati, on September 23rd. The following is the order of finish of the First Five —ALL OF WHOM USED KENDALL PENZBEST OIL THROUGHOUT THE TRIP.

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GEO. W. HOPKINS; *Stinson, Jr.;* Warner

3rd place
THEO. W. KENYON; *Challenger;* Warner

4th place
S. J. WHITTMAN; *Pheasant;* OX-5

5th place
J. S. CHARLES; *Eaglerock;* OX-5

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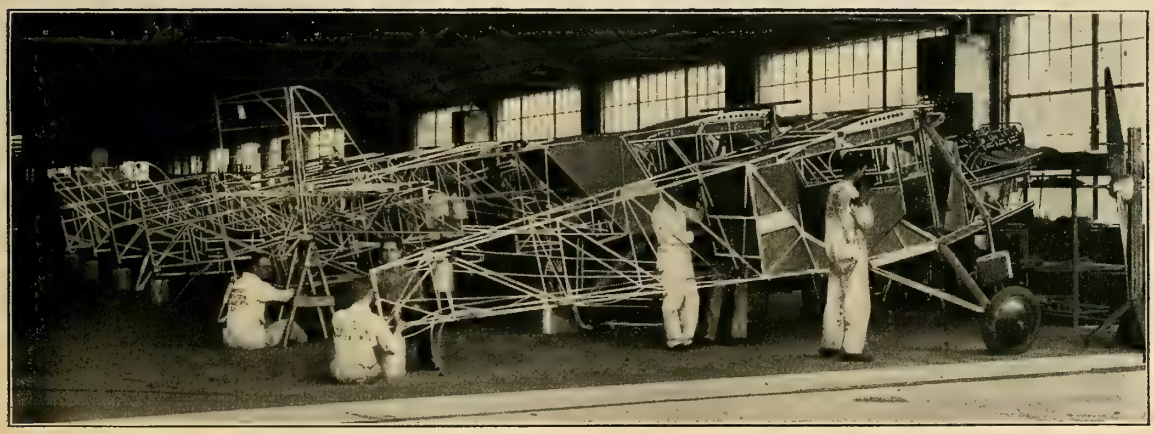
May we send you a copy of "Ground Flying on the Subject of Lubrication"? Address Aviation Division, Kendall Refining Company, Bradford, Pa.

International Aeronautical Exposition, Coliseum, Chicago, December 1st to 9th, 1928

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BUILT *to Specifications*





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Curtiss Robin



Again Goodrich LEADS!

Again . . . as *always* . . . Goodrich leads in the heavier-than-air field

THE reason for this lead is the keen interest Goodrich has from the beginning shown in the field of aviation.

This keen interest was demonstrated in a most practical way during the recent National Aeronautical Exposition at Los Angeles . . . . a Goodrich crew was ready to service any and every plane on the field and actually did service 98 planes.

Look at the list at the right and see what a large majority of the planes was serviced by Goodrich.

Goodrich—the pioneer in the field and present day leader—is not resting on its laurels but working untiringly toward further perfection in rubber manufacturing.

THE B. F. GOODRICH RUBBER COMPANY, *Est. 1870,* Akron, Ohio



Goodrich

List of planes serviced by Goodrich truck crew at the National Aeronautical Exposition at Los Angeles

Vought Corsair
Mohawk Pinto (2 Planes)
Monocoupe (3 Planes)
Fokker Transport (Western Air) (2 Planes)
Douglas Ambassador
Fairchild (2 Planes)
Waco (9 Planes)
Klemm AKL-20 (2 Planes)
Swallow (2 Planes)
Command Aire (2 Planes)
Golden Eagle (2 Planes)
CM-1 (Ryan Mechanics Co.)
Federal
Lockheed-Vega (Woolaroc) (2 Planes)
Kreutzer
Stearman (2 Planes)
Prudden
Cavalier (Star Aircraft Co.)
Buhl Air Sedan
Ryan B-1 (8 Planes)
Boeing Transport
Stinson Detroiter (3 Planes)
Ryan M-1
Eagle Rock (9 Planes)
Buhl (3 Planes)
Air King (2 Planes)
Kreutzer SM-4
Travel Air (5 Planes)
Fokker Universal (2 Planes)
Baby Bullet
Special Built (College)
Curtiss Robin
Thunder Bird (2 Planes)
Lincoln Page (2 Planes)
D. H. Moth (Canadian) (3 Planes)
DeHaviland (School Ship)
American Eagle
Bach
American Moth
Challenger
Bellanca J
Pheasant
Swallow
Pitcairn Fleetwing
Simplex



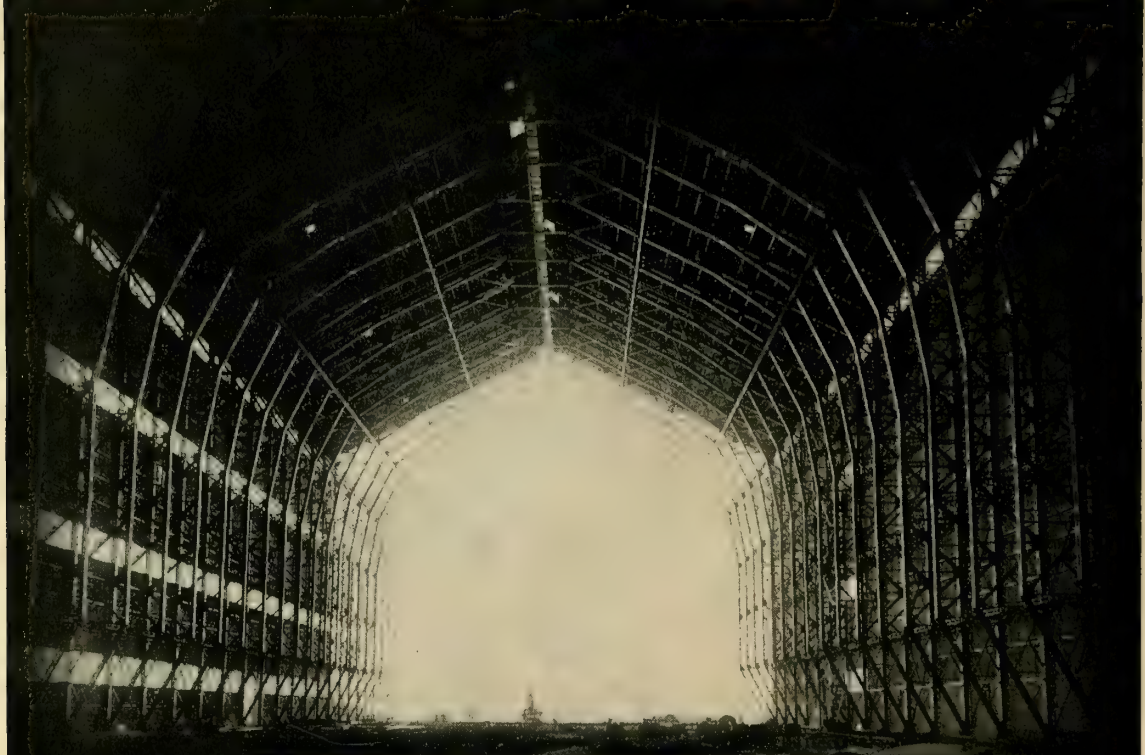






Rubber *for Airplanes*

LARGEST



THIS is the interior of the largest air shed in the world. At Karachi, India. Built for the 5-million-cubic-foot ships that will travel the Inter-Empire Air Route from London to Singapore.

The roof of this hangar is of Robertson Protected Metal (RPM). There is a roof of RPM also on the world's second largest air shed. All the huge hangars on the London-to-Singapore route are to be roofed with RPM. There are 10 RPM-covered balloon hangars in America. And it has been used on airplane hangars by the hundreds. In America, England, Panama, Hawaii, Spain, Greece, Chile and other countries.

For Your Airplane Hangars ...the Same Covering as on These Sheds

RPM, as used on these hundreds of hangars, is a corrugated steel roofing and sidewall material covered with permanent protective coatings. Doesn't rust; doesn't corrode. Ideal for hangars. The happy medium between unprotected metal that rusts away ... and heavy construction that costs too much and can not be moved or readily enlarged or remodeled.

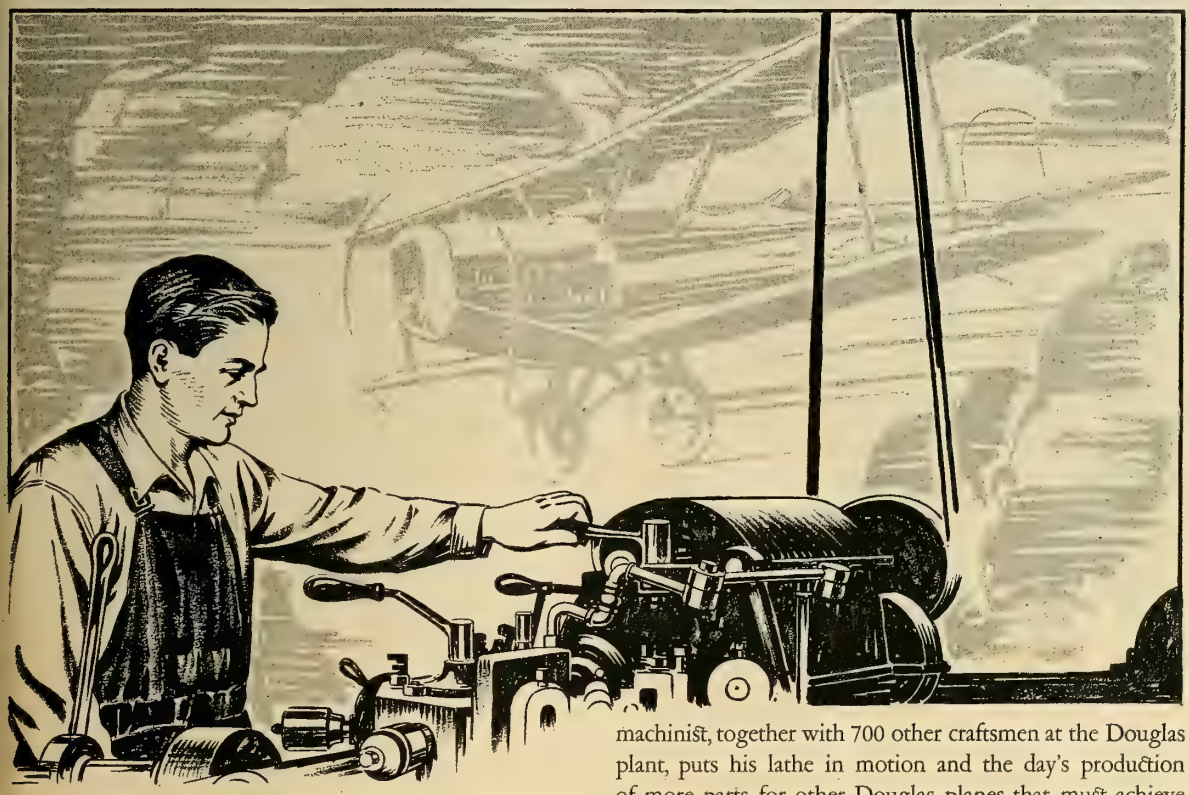
RPM-covered hangars can be taken down, moved and re-erected. That counts a lot the way airports are growing and shifting around. Yet RPM is so permanent it will last for years and years without paint, without expense.

Let Robertson engineers suggest their solution of any airport building problems you have. Costs you nothing and does not obligate you. They have the experience gained in hundreds of hangars ... not merely covering them, but designing, laying out, daylighting and ventilating them.

H. H. ROBERTSON CO. ◥ PITTSBURGH

ROBERTSON

FIRST AROUND THE WORLD



Dependable Flight is Bred by Dependable Craftsmanship

EVERY morning at precisely twenty-five minutes to eight a Douglas Mail Plane sweeps into the air from Vail Field, Los Angeles ... at twenty minutes after two on the afternoon of that same day that same Douglas Mail Plane touches its wheels to the ground in Salt Lake City ... and another dependable flight, by Douglas, is entered in the log of the Western Air Express. ¶ Every morning at precisely half past seven Walter Blutharch, production machinist, together with 700 other craftsmen at the Douglas plant, puts his lathe in motion and the day's production of more parts for other Douglas planes that must achieve similar dependable flights, begins. ¶ Into the hands of Walter Blutharch, production machinist and 700 other craftsmen, Douglas engineers have placed blue prints representing their cumulative research, knowledge and ability. At the disposal of these craftsmen Douglas has placed the finest production materials obtainable. It is the pride of Walter Blutharch, and his fellow workers, that it is their task to combine engineering and materials into a perfectly, precision finished product that soon will soar through the skies proclaiming on flight after flight the fact that ... *Douglas Means Dependability.*

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DOUGLAS
COMPANY
SANTA MONICA
CALIFORNIA

blow · Boreas blow



Blow, Boreas, blow! The pilot, warmly protected by Spalding Winter Flying Togs—happily defies wintry blasts.

For Spalding Winter togs are designed by men who have experienced the numbing cold on hands that clasp the stick—on feet that kick the rudder . . .

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Spalding has, of course, a complete line of flying equipment. Write us for a catalog. A. G. Spalding & Bros., New York, Chicago, Detroit, San Francisco, and Wright & Ditson, Special Distributors, Boston.



A. G. Spalding & Bros.

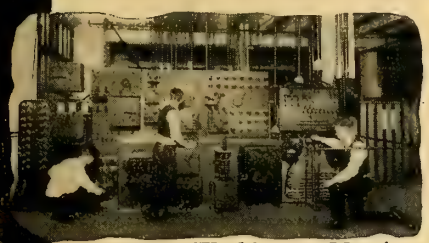
SPALDING WINTER FLYING TOGS

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WHEN you're investing money in planes for transport service the question, "How far will your money go?", takes on a literal meaning. How many miles or years of flying service can your money buy? How can you make a selection which promises the most?

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All this points to the probability, almost the certainty, that a Ford plane will not be made unavailable for service through a crash. Consequently its length of service depends on its ability to withstand wear and depreciation.

There isn't a piece of wood in the structure of a Ford plane. There's not a square inch of fabric in its wings or fuselage. Nothing to rot, to warp, to split; nothing to paint and scrape, to patch and dope or to replace periodically. *The Ford plane is built entirely of non-rusting metal—duralumin.* The original Ford planes, built more than three years ago, are still operating on regular scheduled service. And close inspection (which, by the way, may be carried out without removing any of the exterior covering!) reveals no discoverable depreciation.

How can you make your money go farthest? Any attempt to answer that question must include a thorough study of the structure, capabilities and record of the Ford trimotored, all-metal transport monoplane. Write us for information.

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Division of
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Dearborn, Michigan



Volume 13
No. 5

AERO DIGEST

NOVEMBER
1928

THE MAGAZINE OF THE AIR

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Looking Down on the Earth from an Altitude of 7 Miles

One of the most remarkable photographs ever made from the air. This view, taken by Army Air Corps pilots from an altitude of 37,854 feet shows an area of approximately 33 square miles. (*See also page 958*)

AIR—HOT AND OTHERWISE

They Come Out of the West and Northwest

Let's Have Facts

By Frank A. Tichenor

THE *Graf Zeppelin* is big, impressive and significant of mighty events and perhaps some fundamental aviation peacetime tendencies in days to come, but it is by no means the biggest, most impressive or most significant thing of the month relating to American aeronautics.

That biggest, most impressive and most significant thing is the accumulated and accumulating evidence of the trend of the American business mind to aviation.

Far be it from me to intimate that business is the biggest thing a human mind can turn to, but the fact remains that the United States is great largely because, at least of late years, its biggest minds have turned to business.

So the fact that the American big business mind now turns to aviation automatically gives business bigness to it—which makes it big indeed, for it long has been big in almost every other really important meaning of the word.

The bigness of the big minds that conceived the big idea, the bigness of the big imaginations and heroic personalities that accepted the big conception, and with big willingness to work and sacrifice pushed it over the hill of practicability. The bigness of the bravery of the comparatively small capital so far invested in the industry now is matched by that final bigness which will make American aviation one of the major factors in the age.

Capital, big capital, has come into aviation.

It has not come in for sentimental reasons, not for patriotism, not for adventure. Sentiment, patriotism and the love of adventure are not capitalistic characteristics.

"Show me. If I can jingle it in my pocket, if I can draw checks against it at my bank, it's good", says Business. "Otherwise, let other people play with it. I'm busy."

The fact that American business is going in for aviation is, in other words, proof that it is sound, solid and promises high profits if well managed. American business is going into aviation because it sees in it real opportunities to make real money legitimately while, at the same time, developing the essential transportation facilities of the nation along sound progressive lines. In other words, it sees in aviation not only a "going" business, but a growing business.

The wise judgment of the Guggenheims is proved in one of the operations which recently took place. Looking about for someone who could operate air transport in its infancy in such a manner that it certainly would have a chance to grow to a strong maturity, if the possibility was in it, they selected as the first operative head of the Model Airway, Harris M. Hanshue, of the Western Air Express. The good judgment, therefore, is reasonably certain of continuing beyond the glory of the fine conception into minutiae of detail arrangement and management.

Under Mr. Hanshue's direction, the first planes for the new airway were three F-10 Fokkers. Put at work upon the Los Angeles-San Francisco route, they showed a profit within three months.

Mind you, they showed a profit without subsidy! We have heard much about the greater rapidity of European air transport progress. Well, it has all been subsidized by governments. Therefore it has not been quite genuine. It has not quite flown with its own wings alone. The fact that Mr. Hanshue's three months of operation of the Model Airway between Los Angeles and San Francisco actually showed a legitimate business profit indicates that in America, once more, by choosing the hardest way we have chosen the wisest way.

So ends the first chapter of what will be, before it finally closes at some very distant future time, one of the greatest historical epics ever written—that which shall tell to far off generations the story of American air transport's beginnings and developments.

Now for Chapter Two!

Mr. Hanshue emerges once more into the limelight, bringing with him James A. Talbot, president of the Richfield Oil Company, and, as their associates, some of the biggest business men in the whole country, reorganizing and taking control of the Fokker Aircraft Corporation of America.

Behind this they have put an actual capital of four million dollars—real money.

Furthermore, it is ALL paid up. No underwriting profits go to any inside group, any broker's office or anywhere except the treasury of the organization where the money will be readily available for wise use in development. Every penny was privately subscribed in advance of the announcement. No campaign by high pressure stock salesmen was required or would have been tolerated by these men.

Mr. Hanshue and Mr. Talbot make a pair of master minds, which from now on will be devoted to American aviation and surely do add wonderfully to the stability and super-speed development of this wonderful industry. Mr. Fokker retains a stock interest and now will have the opportunity—for which no doubt, he has been yearning—to devote all his genius and his time to the development of new types of practical, profit-making, worthwhile aircraft.

Hanshue has demonstrated his ability at management, for his Western Air Express has been the only similar enterprise in America to make dividends. Mr. Talbot has demonstrated his ability as an organizer in everything that he has ever touched and has earned the confidence of every big banking organization in the country.

The linking of the minds of these two men will insure big business with confidence in the worthiness of aviation to be added to the growing list of big American activities.

THAT, alone, is almost enough good news for a month, but other big things are in the air. Note: in the AIR.

William E. Boeing, of the Boeing Airplane Transport Company, makes an announcement which is almost equally momentous when he tells us that his company has been reorganized with the full backing of the National City Company of New York—one of the strongest financial groups in the whole world. Furthermore, adding to the strength of this magnificent combination, is the complete association of the Pacific National Company of Seattle.

Thus anywhere from five to ten million dollars are made available for Mr. Boeing's requirements—again without any stock flotation!

Why does Mr. Boeing get this splendid backing? Because he has fully proved that he knows not only how to manufacture aircraft, but how to operate airways.

It was the rapid development of the airplane business which made it desirable for him to get more capital. The soundness of the field in which he labors is indicated by the fact that he gets that (*Continued on page 1026*)

The L.Z.127 COMES to LAKEHURST

By Francis D. Walton

IN a span of 111½ hours, between 2 a. m., Thursday, October 11, and 5:38 p. m., Monday, October 15, the *Graf Zeppelin*, the 127th design in the Zeppelin dynasty of dirigibles, followed its immediate predecessor in that line, the *Los Angeles*, formerly the L.Z. 126, across the Atlantic Ocean. Between the two crossings four years to a day had intervened, but all of the circumstances and conditions surrounding the coming of the newer and bigger ship made it seem as if at least a decade separated the two events.

Whereas the *Los Angeles* had crossed with a skeleton crew to demonstrate naval tactics, merely to be delivered at the conclusion of its flight to the United States Navy, the *Graf Zeppelin* came with a full crew of forty and a passenger list of twenty, marking the first regular crossing of the Atlantic by a passenger-carrying airship.

All was not easy sailing in the trip which the *Graf Zeppelin* made from Friedrichshafen, Germany, to Lakehurst, New Jersey. There were bad storm areas around which it had been necessary to take the dirigible in circuitous flight. There were headwinds which held the ship back, and finally there was the incident of the broken port fin. These adverse conditions, at first viewed as likely to cause a considerably unfavorable impression for the Zeppelin company's great demonstration, worked quite to the opposite effect by offering clearly defined evidence that the modern dirigible is not a fragile, floating bubble but a structure capable of meeting and conquering the most adverse and widely variable conditions of the upper air.



Dr. Hugo Eckener.

When the *Graf Zeppelin* was received at Lakehurst by a navy ground crew of 450 men at dusk on October 15, she had been flown over a course 6,300 miles long, and there were no dissenting voices to be raised against the claim that the great dirigible had been perfectly and expertly navigated around a whole line of bad storm areas. Most of the low barometric areas had been known to exist before the start of the flight, but Dr. Hugo Eckener, as commander of the ship, had set a certain day for the start of the trip, and he had refused to allow existing weather to interfere with that schedule. So even if the *Graf Zeppelin*, on her maiden voyage, did not arrive on schedule, she did that thing which is yet far more remarkable in aeronautics, generally speaking—she started on time.

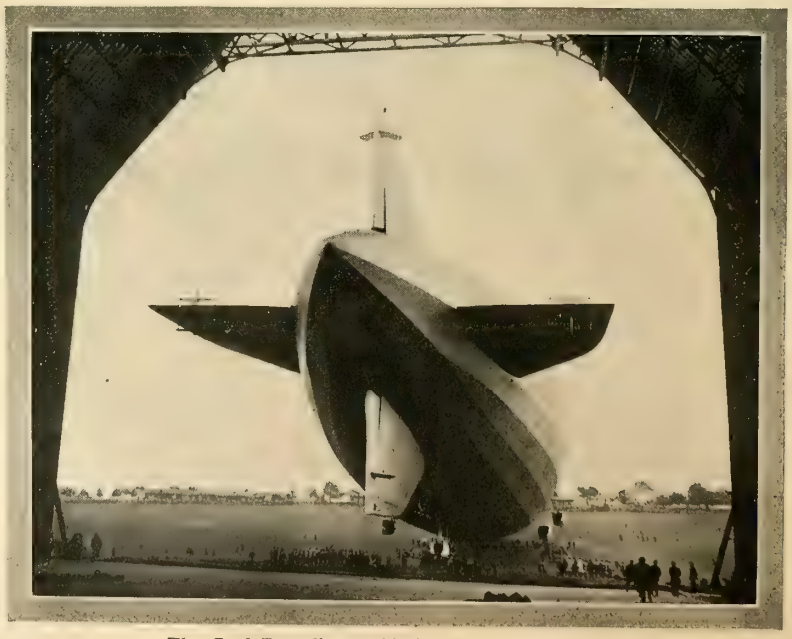
Except for the rent in her port fin, the *Graf Zeppelin* appeared, on landing, rugged, firm and unmarred by the storms through which she had passed. And the four-city tour over Baltimore, Washington, Philadelphia and New York, which she made before touching at Lakehurst, was clear enough demonstration that the ship was in no sense "all in" after the Atlantic crossing.

There was considerable talk and comment regarding the damage to the port fin. That accident was blamed in unauthentic accounts upon a green helmsman. Captain Ernest H. Lehmann, the chief executive officer, gave the writer the following acount of the accident, absolving the helmsman completely.

"We were proceeding on course east of Bermuda on Saturday," he said. "Because of headwinds we were behind schedule, but everything was going well when we struck an unusually bad bump. It was extraordinarily bad, I might say, but the ship went through it well, and at no time did she list more than fifteen degrees. And, after coming through everything, proceeded normally. The rent in the fin was not discovered by her immediate reactions, but only in the routine inspection which followed. I am convinced that the tear was caused by faulty fabric which should, if it had been sound, have stood up under that strain. It is something that will never happen again."

Dr. Eckener, in speaking to the writer, referred to the trip of the *Graf Zeppelin* only as a "test run."

"Certainly nothing transpired that could not have happened on the maiden voyage of an ocean liner," he said. "It would be ridiculous to expect a 100 per cent performance in the case of the



The Graf Zeppelin outside its shed at Friedrichshafen.



The Graf Zeppelin sailing over Philadelphia, Pa., on its way to Lakehurst *Wide World photo.*

maiden voyage of a steamship, particularly coming through such weather as we came through. Much has been made of our little mishap with the port fin. It was nothing. We had to lay to while repairs were being made, but the fact that we could do this while over the ocean carrying a full passenger list and no one the worse for it, shows that the Zeppelin has achieved a great success."

In the opening stages of the flight, everything seemed to be building to an overwhelming success. Dr. Eckener got his ship underway in the face of gathering storm areas, but on schedule. The fact that the *Graf Zeppelin* had to go on a long detour to the south in getting out of Europe, running neatly around the low barometric areas as far south as Morocco, added to, rather than detracted from, the possible reward of public acclaim. The detour added hundreds of miles to the flight course. When Captain Lehmann finally straightened out the ship's course, running almost due east from Madeira, a considerable amount of time had been lost. So much so that it was decided not to check over the Azores, but to make the run straight for Bermuda.

In the meantime on this side, the interest on the part of the public was mounting in a fashion that could only warm the cockles of the hearts of every lighter-than-air man in the country. The Navy, desiring to win support to its large airship program, prepared to coöperate in every way possible, and of the preparations that were made at Lakehurst for receiving the ship, there is hardly ground for the smallest and severest critic to dance on.

Full credit must be given to Dr. Eckener for his magnificent gesture in putting his ship over the four-city course from Baltimore, to Washington, to Philadelphia, to New York and back to Lakehurst before landing. It was a fine demonstration of the dirigible's staying power, and in each of the cities over which the *Graf Zeppelin* flew, a certain measure of the lost acclaim for dirigibles was won back again.

The flight of the Zeppelin over these cities was far more dramatic than the landing. But at her journey's end, while the crowd was not as large as on Sunday, there was present a group of lighter-than-air enthusiasts to whom the fine points of the new ship were well worth the long wait.

To men competent to view the new arrival at Lakehurst through expert eyes, it was evident by looking on the ship as a whole that in the refinement of design new high speeds had not been sought to the detriment of safety or load carrying efficiency. This tale was told in the ship's length to the diameter ratio of the hull.

The actual dimensions of the ship, which resulted from these strict considerations, are 776.24 feet in length; 98.44 feet in diameter, 110.56 feet in height above the ground, with a rated gas capacity of 3,708,043 cubic feet.

(*Continued on page 1022*)



After its long voyage from Germany, the Graf Zeppelin is safely landed at Lakehurst. *Wide World photo.*

TEST FLIGHTS OF THE GRAF ZEPPELIN

By Dr. Carl Hanns Pollog



THE new German airship, *Graf Zeppelin* (L.Z.-127), made its trial and test flights later than at first projected. The ship had been completed and made ready for flights some time before, but had been delayed for technical and official reasons. It had proved difficult to manufacture a sufficient quantity of the new fuel gas, the use of which is the most important innovation in the new ship.

When eventually the quantity of fuel gas available had become sufficient for at least some test flights, a new delay was caused by officialdom—the German Traffic Ministry refused to give permission for the flights, maintaining that certain insurance formalities required by law had not been fulfilled and that the Deutsche Versuchsanstalt für Luftfahrt (a semi-official body which issues airworthiness certificates for every type of aircraft which serve as bases for approval of these types by the government) had not received satisfactory answers to several questions it had formulated regarding the proposed gas fuel. Especially had this body doubted that the ventilation in the interior of the hull would be sufficient to prevent the formation of an explosive mixture with atmospheric air of the fuel gas and the hydrogen diffusing through the fabric of the ballonets.

Therefore, when permission for test flights was given, it was granted only for flights with benzol as fuel. In the afternoon of September 18th, the new zeppelin left its hangar for the first time. The ship started for its first trial flight at 3:30 p. m. No passengers were on board, the sole object of this flight being to test the maneuverability, airworthiness, speed and climbing power of the dirigible. It cruised over Lake Constance and its shores for 3 hours and 15 minutes. Dr. Eckener was highly pleased with the results of this first flight; he had never commanded a zeppelin which could be steered so easily, he said. A speed of 68 miles per hour had been attained —nearly the calculated maximum speed.

Two days later, the *Graf Zeppelin* was ready for a second flight, this time a full day's trip with passengers (German, American and English journalists). The route was from Friedrichshafen to Zurich and Basel, then down the Rhine to Frankfurt by way of Freiburg, Baden-Baden, and Mannheim. From there the ship returned to Heidelberg, proceeded over the hills to Stuttgart, and then on to Lake Constance. L.Z.-127 had started at 8 a. m. and touched ground again at 5:25 p. m., having been in the air for 9½ hours.

This flight had shown that some slight alterations were advisable. Contrary to theoretical calculations, the three rear engine cars had not been completely free from the influence of the slipstream of the two other engines, and also the ventilation did not work quite satisfactorily. It was, however, sufficient to appease the doubts of the Deutsche Versuchsanstalt für Luftfahrt. In fact, it was more than sufficient. The result was that the fore part of the hull was swelled up, while in the rear part the frames and girders showed skeleton-like through the covering fabric.

The next flight, therefore, could not be undertaken before September 26th. This flight served principally for testing and tuning in the wireless installations and lasted only from 2:07 to 5:55 p. m. Some official passengers were taken up, while two scientists made some measurements with regard to Einstein's relativity theory.

September 28th saw the second long trip of the *Graf Zeppelin*. This was the first flight made with the engines running at least partly on the new gas fuel, and special attention was paid to the operation of the engines when being switched over from benzol to gas feeding and vice versa. The results were entirely satisfactory and followed closely the previous calculations. The flight started at 7:04 a. m., the ship going by way of Munich and Rosenheim to Salzburg. The proposed visit to Vienna was cancelled because of headwinds. Consequently the ship flew to Regensburg along the Salzach and Inn rivers and from there up the Danube to Ingolstadt, where it turned to Augsburg and back to Friedrichshafen.

On October 2nd and 3rd, L.Z.-127 made its longest trip previous to its flight to America. This was intended to be a kind of "general rehearsal" for the trans-Atlantic flight. Dr. Eckener had originally announced that he would go to Berlin, on to the extreme northwest of Germany, and to Königsberg on the first day. He then intended to cruise over the Baltic Sea during the night, perhaps touch Stockholm in the morning of the second day, and finally return to Friedrichshafen via Berlin. The weather, however, forced him to alter his decision, for after having passed Ulm and Bamberg, the *Graf Zeppelin* encountered so strong a headwind that its speed was diminished to 30 miles per hour. It therefore turned to Würzburg and Frankfurt and down the narrow Rhine valley, over a part of the occupied territory, to Cologne, where it circled the cathedral and the International Press Exhibition. Then the ship proceeded to the Ruhr Basin and Holland, where it passed Rotterdam in the dusk and reached the North Sea between Höek van Holland and Scheveningen. It crossed over to the east coast of England (Lowestoft and Yarmouth) and went back over the North Sea to the German island of Borkum which was reached about midnight. In the small hours of the morning the ship appeared over Bremen, then went again over the sea, and came to Schleswig and Flensburg (the birthplace of Dr. Eckener) at dawn. By way of Kiel and Hamburg it then proceeded to Berlin where it circled for about three quarters of an hour. *Graf Zeppelin* then turned its nose homeward and reached Friedrichshafen at 5:30 p. m.—after having touched Leipzig, Dresden, and Asch (Czechoslovakia). It had been in the air for 34½ hours, had carried 71 passengers (instead of 20) over nearly 2,000 miles and had reached (over the North Sea) a height of 8,500 feet. In spite of the headwind and the many turns and roundabout ways (to visit as many towns as possible), the average speed during this trip was perhaps 56 miles an hour.

With the exception of the last and a portion of the next to last, all the trips of L.Z.-127 were favored by exceptionally fine weather.

The Zeppelin was welcomed with enthusiasm everywhere, not only in Germany, where its flights were a national event, but also in Switzerland, Holland and England.

COMMERCIAL FLYING IN ENGLAND

By
James Warner Bellah
Special Foreign Correspondent to Aero Digest

I INTIMATED in my last article that fear of the convertibility of civil airliners into bombers in the event of war was one of the big factors behind the development of commercial flying in Europe. There has been another incentive, equally if not more potent, that we in America have not had either, and that is the necessity in ground travel for passing many troublesome frontiers in comparatively short distances with their attendant railway changes, customs examinations and passport inspections. The trip from Paris to London, with its two railways, its boat and its wild and nerve-racking scrambles at Folkestone and Boulogne, a case very much in point. The airway routes have done away with the inconvenience and the attendant loss of valuable time which, for the same distances in America, we have not been faced with. For this reason alone, the European has had a legitimate commercial demand for flying—a demand that has increased by leaps and bounds until today he has 24,390 miles of airlines regularly operated by English, French and German companies alone.



An Imperial Airways Short "Calcutta" fifteen-passenger flying boat.

Perhaps the most striking factor in European commercial flying is the seeming casualness that comes of its meticulous organization. It is just nine years ago to the month that the first British passenger 'plane left Hounslow aerodrome for Paris, carrying two passengers at a price of one hundred dollars each. And it was only four years ago last March that the Government subsidized Imperial Airways came into existence—today a 5,000,000 dollar concern, with a ten-year sliding-scale subsidy of another 5,000,000 dollars, operating 1,000 daily miles of Continental air routes and 1,100 daily miles between Cairo, Egypt, and Basra, near the Persian Gulf, via Bagdad.

Before taking up a technical consideration of the organization that makes such operation possible, it is perhaps interesting to picture the casualness with which air travel *is* accepted. I don't mean the absence of novelty or the physical fear of injury on the part of the passenger alone—I mean more—a certain apathy if you will, a certain acceptance of boredom, that one invariably associates with train and boat travel only.

Croydon, the northern junction terminus of all European airlines, is the airport of London. Its development from the novelty of an aerodrome to the commonplace of a railway station has been so gradual that it is taken for granted over here. There is a waiting room with ordinary station benches, booths for magazines and newspapers, cigarettes, cards and games. There is a central pillar announcing times of arrival of planes from Antwerp, Amsterdam, Paris, Berlin or what places can you name? There is a large code chart on the wall showing weather to be expected. There is a corridor labelled "Departure" and another "Arrival." There are first and second class travel accommodations in the planes themselves.

A frumpish woman of some sixty few summers gets up and looks at the departure bulletin and corrects her watch to the minute. A porter comes in and says: "Paris, please." A dozen people get up, gather wraps and umbrellas and go down the corridor to the cement termac. Porters come through with baggage. Engines bark into life. A white-coated steward hops down from the open door of the 'bus to hand the women in. Nobody pays any more attention to the 'plane or the pilot than they would to a train and its engineer. They climb in and take their seats. The engines are revved up, the door closed and the chocks pulled. The 'bus wobbles around into the wind, opens up and hops off on time to the second.

The steward passes down the aisle presently with little sanitary packages of para rubber ear plugs and chewing gum against any possible air sickness which is, by the way, rare. Papers are spread out, magazines opened. Eyes close with the drowsy monotony of the motor roar. Two and a half hours later—Le Bourget Aerodrome, Paris.

Fifty large airliners arrive at and leave Croydon each day: "The express from Antwerp, sir? Yes, sir, she's due in fifteen minutes. You can see her come in from the hotel terrace."

But behind all this casual acceptance of a service, there is a most intricate and thorough technical organization that has, by its results, engendered the casual acceptance we speak of.

The machines used are the trimotored (Armstrong-Siddeley Jaguars), Armstrong-Whitworth "Argosy" type and the Napier-engined Handley-Pages, the former carrying 18 passengers and 600 pounds of freight, exclusive of crew, weighing 8 tons loaded and developing well on to 2,000 h.p. with a

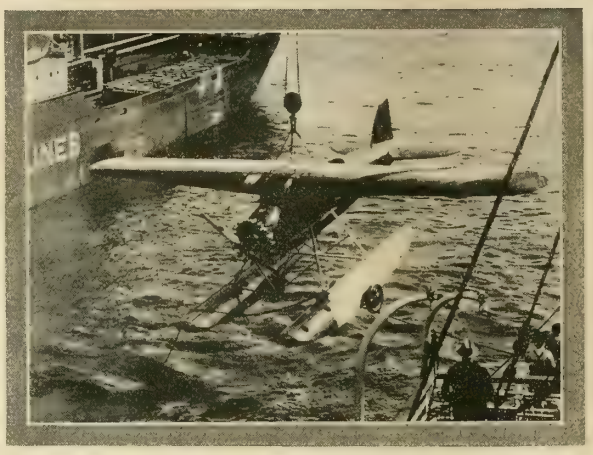
(*Continued on page 1022*)



A Handley Page W.10 in flight and below it an Armstrong Whitworth London-Paris airliner taking on passengers.

THE ANTARCTIC AIR EXPEDITIONS

THE Antarctic like the Arctic is to give up some of its ice-locked secrets to the airplane. Two expeditions, both provided with the most modern of flying equipment, are slowly converging on the last continent to hold out against the restless energy of man. Starting from opposite sides of the world, Commander Richard E. Byrd at the head of eighty men and a small fleet of ships and Captain Sir George Hubert Wilkins with but four men besides himself hope to survey as accurately as the camera and scientific minds can bring it out thousands of square miles of Antarctica. They hope to bring back data that will be of inestimable value to the meteorologist. They expect to discover and plot new fishing grounds of great economic value and perhaps discover in the icy mountain ranges of the continent itself mineral wealth worth exploitation.



Wilkins' Lockheed "Vega" being hoisted aboard the steamer.

The two expeditions have been planned entirely independent of each other, yet the areas the two explorers have decided thus independently to attack could not have been chosen better for a unified expedition of discovery. Byrd plans to strike in from the Bay of Whales, roughly southeast of New Zealand. He plans to fly to the Pole from his base where the Ross Sea icepack meets Graham Land. He also hopes to explore for miles the inland wastes of Graham Land, striking out to the east from his bases which will be established at hundred-mile intervals on his route to the Pole.

Byrd plans, if all goes well, to extend his explorations beyond the Pole, but he will be satisfied with a thorough mapping of that big plateau which extends outward from the Pole toward Ross Sea and the Bay of Whales.

Wilkins, who has already reached Montevideo, his jumping off place for "Down Under", is to establish his base at Deception Island, a rocky desolate spot almost due south from Cape Horn and about sixty miles from the rugged cape known as West Antarctica which divides Graham Land from the little known Waddell sea. He plans to fly along the coast line westward toward Ross Sea, exploring from the air as he flies. His take-off point is roughly about fifteen hundred miles from Byrd's proposed base. Wilkins will cover one long side of the triangle over unknown country, while Byrd is working inland toward the Pole and east past King Edward VII Land and the inland edge of the ice barrier.

Thus the work of the two explorers will to a certain extent be supplementary. The knowledge gained by one will be of aid in recapitulating the achievements of the other when the work has been finished and they return to civilization.

In the last few years the parts played by the airplane in exploration have increased in importance and magnitude. Although for more than half a century explorers have talked of using lighter-than-air ships for work in the Arctic, over Africa and in other unknown parts of the world, it is only recently that the plane has been thought practical for such purposes, and it is fitting that Byrd and Wilkins should be the men who expect to prove once more the superiority of the airplane in travel over such regions.

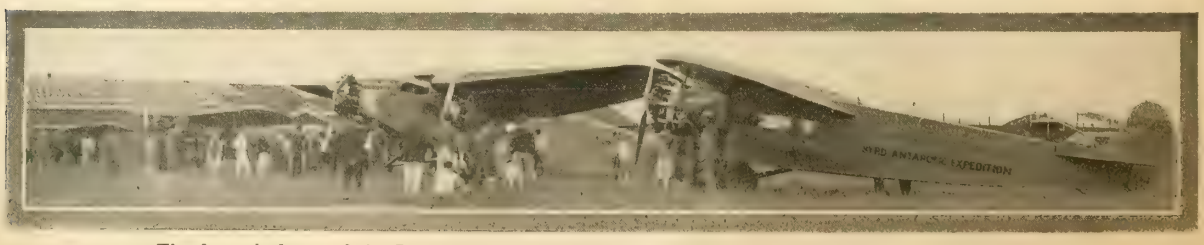
It was they who first achieved startling success in the Arctic. It is hardly necessary to recall the Byrd-Bennett flight to the Pole and return to their Spitzbergen Base in a trimotored Wright-engined Fokker in 1926 or the more recent, and certainly not less startling, flight of Wilkins and Eielson across the top of the world from Point Barrow, Alaska, to Spitzbergen in their Whirlwind-powered Lockheed Vega, one of the two planes that Wilkins is carrying on his Antarctic expedition.

In less than two full days of flying these aeronautical explorers established as facts what, after a century of "foot slogging" and dog sleds accompanied by great loss of life, had still been conjecture to other explorers—the absence of land close to the Pole, between Alaska and the group of islands that mark the outer and northern boundaries of Europe.

Amundsen, Scott, Shackleton and others, after extraordinary hardships and through months of struggle, established something of the physical nature of the Antarctic continent, but their explorations were inhibited by mere physical limitations to a tiny area in comparison to what the airplane and the aerial camera can place before the eyes of the world.

Let us consider the plans of these two explorers in more detail, and because his are vastly more simple although frought with almost as great possibilities in the way of achievement, we will take up those of Sir Hubert Wilkins first.

The Wilkins expedition, or Wilkins-Hearst Expedition



The four airplanes of the Byrd Expedition. Left to right—General, Fairchild, Ford and Fokker.



P. & A. photo.

Members of the Byrd Expedition. Left to right (top row)—Lt. Shropshire, J. DeCecca, Russell Owen, Capt. Alton Parker, E. J. Demas, Richard Brophy, Commander Byrd, William Vanderveer, Bernt Balchen and Harold June. (Bottom row)—Chas. Lofgren, Martin Runne, Sergt. Rother and Sergt. K. F. Bubier.

as it has come to be called since the publisher undertook to back it, left Montevideo aboard the sturdy whaler *Hektoria* on October twenty-fourth. The equipment consisted of two Lockheed Vega monoplanes powered with 220 horsepower Wright Whirlwind motors. Each plane is provided with both radio transmitters and receivers, equipped with pairs of pontoons and skis and lined within with insulating material as protection against the cold. Captain Wilkins chose the type of plane he is using for several reasons, first perhaps because of the proved efficiency of his Lockheed in the Arctic, its great speed and climb, and the peculiar property of the tight monocoque fuselage for holding out the cold and retaining the warmth. Wood in this particular, impermeability to temperature, has shown itself superior to metal construction.

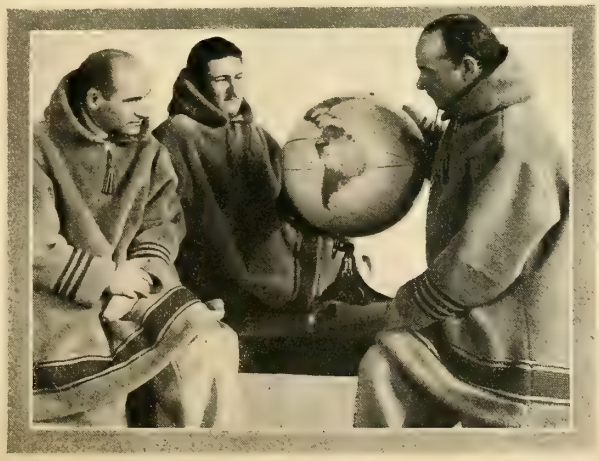
Wilkins also is taking spare parts, two extra motors, propellers and other accessories to provide against any exigency save complete washouts. He has had his experiences with these. On one occasion with Ben Eielson, who is accompanying him on this expedition, he came down a hundred miles out on the frozen Arctic sea from the Alaskan coast. The ship was done as far as immediate flying was concerned, and so the two set out calmly to walk home. That they succeeded in arriving back at Point Barrow many days later, in good shape physically and ready to start again as soon as equipment could be made available, is an index of their proficiency in polar exploration. Wilkins is taking but three men besides Eielson. Joseph Crossan is going along as relief pilot, and there are two mechanics, William Gaston and Orval Porter. The crew was selected by Eielson, who has well earned the reputation as one of the best pilots over snow and icebound regions in the world. Crossan is a pilot who has worked with Eielson in the Arctic, and as Captain Wilkins says, ". . . he knows his ice." The two mechanics also have had valuable experience in setting up planes and overhauling motors in the frozen north.

From Deception Island Captain Wilkins, in Plane Number 1, as he has styled his first Lockheed, the veteran of his across the top of the world flight, plans to fly across the intervening sea to a point several hundred miles inland on Graham Land where he will establish his base. Plane Number 2 will be used to ferry gasoline, food and other equipment for this base from where he will conduct his major exploration trips. Another base is being prepared near that of Commander Byrd on the Ross Sea, where gasoline, oil and provisions have been sent from Tasmania.

Wilkins is primarily interested in the collection of weather data. It is his contention, which has been borne out by the observations of other meteorologists, that many of our greater weather disturbances originate in the polar regions. It follows then that the establishment of meteorological stations as close as possible to the poles may result in more accurate weather forecasts for the whole world. The Guggenheim station on Mt. Evans, Greenland, is the first important venture along these lines to be established. Wilkins hopes to gather proof on his flights over Graham Land that will warrant the establishment of several such stations there.

After making several comparatively short flights over the regions surrounding his base, Captain Wilkins plans a long flight to the Ross Sea where in all likelihood he will run into the Byrd expedition. He hopes to be at his Deception Island base by December and to complete his work in time to start back before the Antarctic winter — our summer — brings

(*Continued on page 1042*)



Eielson, Crossan and Wilkins in their Worumbo polar suits

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THE GRAF ZEPPELIN

THE *Graf Zeppelin's* flight from Germany to the United States, although it has been done before, marked a step in the development of lighter-than-air effort. It was one more indication that the dirigible, in the course of time, will take its place, and an important one, in civilian long distance air transport of passengers and goods. The flight seems to have had no significance with regard to zeppelin usefulness in war, either for offence or defence. We question that. Dirigibles are too slow, too cumbersome, as targets too magnificently easy marks.

But if the Germans can produce the *Graf Zeppelin,* which as we write is comfortably moored at Lakehurst, our manufacturers can build as good or better.

The possibilities of the dirigible for civilian purposes justify the expenditure of effort and of money to produce in the United States the best that can be made.

The all-metal dirigible now being built for the United States Navy seems to us to promise the possession of considerable advantages over the big German craft with fabric envelope.

We feel sure that thus and in some other ways we shall improve upon the German tailor-made, and our convictions with regard to American aircraft manufacturers of either heavier or lighter-than-air craft never yet have met with disappointment.

We expect a real development of American-built ships, somewhat of the *Graf Zeppelin* type, but better, for peace-time passenger carriage.

BINGHAM

WE have heard more favorable comment upon the election of Senator Hiram Bingham to the Presidency of the N. A. A. than, during a wildly political month, we have heard comment on the fitness of Hoover and Al Smith to hold the presidential chair down for the nation. But then, of course, ours is an air-minded shop, where it is fully understood that the one thing of paramount importance to the country and the world is the right development of aviation.

We believe the Senator is sure to make the N. A. A. all over, creating it into a representative body which will do those things worth while, and certain to promote the growth of aviation.

We submit for the Senator's consideration the belief that a million members in a year can be secured by active, energetic work, everybody pulling on the rope, and the reduction of the dues to a dollar.

This done, the elimination of useless societies and clubs, promoted for selfish profit and harmful to the best interests of American aviation, automatically will take care for itself.

We believe, further, that a million members, working under the able Bingham leadership, would make this nation so completely air-minded that world leadership in every phase of aviation inevitably would be certain.

The idea is worth trying. We hope the Senator will bring it to the notice of the Board of Governors at its next meeting. AERO DIGEST has no hesitation in guaranteeing for New York's quota a full hundred thousand.

CONGRESS

IN another month, although the robins will have gone southward from Washington, Congress will again be gathering, this time for the short session. Very important proposed legislation with regard to air will be ready for its grave consideration.

In the Senate, for example, the Furlow Bill was left undealt with. It must be passed in the form in which it left the House and without the amendments tacked to it by the Senate Military Affairs Committee, which, if allowed to stand, would utterly destroy its usefulness.

Coördinated effort on the part of the Army and the Air Corps will put this bill across in the form in which it should be passed.

Several occurrences, all affecting this important bill, during the closing days of the late session when it was very near to passage, made us feel that somebody fell down—or worse. A little coöperation from Pennsylvania Avenue would have carried it over the top. But there were little obstacles instead.

Now AERO DIGEST rises to address those obstacles and the meaning of its address is as follows: they will be watched by steady eyes (a little bloodshot, possibly, for wrath has that effect on eyes sometimes) from the day that Congress opens till the day that Congress says goodbye and goes back home, and while it is conceivable that Army men and Navy men with special interests, who wish to see it die, may have the power to kill the bill again, they will not have the power to prevent us, later on, from explaining their activities during the last days of the Congress that is gone.

Interference by them during the short session with legislation which is absolutely vital to the nation's air defense and air defenders will be of the nature of a boomerang. And boomerangs, sometimes, can strike tremendous blows. And that, dear friends, is that!

WE SEE BY THE NEWSPAPERS

WE see by the newspapers that a plane crashed yesterday at—and that another tragedy occurred at—. We are unhappy over these things, but we wish the newspapers would headline them in real relationship to their importance. Their honest-to-goodness, real importance, as, in these days, they headline railway accidents, motor car crashes and the falls of people out of windows.

And even before they realize that reasonable treatment of air accidents is but right and proper, we wish that they would read with care and publish at least extracts from such items as the following, which continually are supplied to them but which often are ignored:

National Air Transport planes have flown 3,306,207 miles without the slightest injury of any kind to a passenger, or the loss of a single ounce of mail or express since the beginning of operations, May 12, 1926.

This tremendous mileage, a distance equal to more than 132 times around the earth at the equator, was flown on regular routes, over half of it during the night, through all kinds of weather.

In this flying there was no stunt flying of any nature whatsoever. The pilots and ground crews are responsible for this fine record. They are imbued with the same spirit which their predecessors of the pony express days cherished so valiantly.

MALICE IN BLUNDERLAND

By

by Caldwell

(*With apologies to Lewis Carroll*)

ALICE felt very sleepy and tired as she sat beside her sister on a bench in Central Park, watching the Sunday strollers glide past the Fifth Avenue Churches and turn toward Broadway and the Movie Mansions. The day was very, very warm: so warm that little Alice was thinking idly that she could do with a large, cool beer—for she was quite a modern child, and—for her years—quite an expert froth-blower. In fact, there were mighty few tricks that little Alice wasn't hep to; she could open a White Rock bottle on the handle of a hotel bureau drawer, or even on a telephone. And as for a bottle of Scotch—! Well, if nobody in the party had a corkscrew, and if Alice had forgotten her own, she knew how to wrap the bottle in a bath towel and smack it on the end. She was always the life of the party, until she passed out.

"I wonder why I feel so sleepy," sighed Alice, yawning and leaning back on the bench, while her big sister chatted amiably about Foreign Missions and the good that could be done by sending knitted wristlets and woolen comforters to the heathen—who, like enough, would have used them for nose-wipers. Alice's sister was a member of the W. C. T. U. and the Ladies' Aid—none of which helped her to be really bright company for a snappy young girl like Alice, who long ago had left the Ladies' Aid to go to the Gentlemen's Assistance. In fact, upon Alice her big sister had the effect of a Tom-tom Heflin speech or a sleeping powder—which are really the same things in different wrappers. And this particular Sunday was no exception: Alice found herself yawning more and more frequently behind her hand and saying "Yes?—Oh, yes?" at regular intervals, as though she had been following the conversation, which, fortunately for her, she had been too bright to do—or she would have dropped asleep long ago. And a young girl can't really afford to drop asleep on park benches—or even in Ford Coops—these days.

But still her good sister droned on and on about how happy the heathen would be, if only we could send some more missionaries to induce those benighted darkies to wear pants and a high hat, like Grover Whalen—or even spats, like Grover Loening, Chance Vought's little boy friend. "A pair of spats," said her big sister, "would be a step in the right direction—spats are so modest and cultured, don't you think?" The talk was very good and very dull—and, in truth, goodness and dullness almost invariably seem to go together, though I'm sure I don't know why they should. Anyhow, poor bored little Alice felt that she was falling asleep, when suddenly a large, cross looking Crab scuttled past her, clicking his claws angrily.

Now, there was nothing so *very* remarkable in that; nor did Alice think it so *very* much out of the way that the Crab should be wearing a Naval uniform; for she thought, naturally enough, that he was merely some new Naval advertising device, shoved into Central Park by the Navy Publicity Department—the only really efficient department in the whole Navy, outside of the Bureau of Aeronautics, or the Marines, who do all the Navy's fighting for them. But when Alice heard the Crab say, in a very disgusted and emphatic tone of voice, "To hell with everything! To *hell* with everything!" she started to her feet; for it crossed her mind that she had never, in all her life, heard such a vigorous expression coming out of anything clothed in a Naval uniform, which acts as a sort of muffler or silencer on anything that wears it.

"Dear me!" exclaimed Alice. "That's about the oddest creature I've ever seen in a Naval uniform—and I've noticed some very odd creatures in Naval uniforms, too." The Crab certainly was a most forlorn and hopeless looking object as he scuttled past. His poor old blue uniform was wrinkled and baggy at the knees; and the lower rear part of his shell was easily and disconcertingly discernable through a rent in the seat of his pants, while a pair of metal wings on his jacket were much tarnished—which led Alice to suspect that they weren't gold at all.

As the Crab shoved off, cursing to himself, Alice was moved to follow him—for after listening to her good sister all afternoon and to the Reverend John Roach Straton all morning, she felt that she was entitled to a little variety and pleasure. So she hurried after the Crab, leaving her big sister absolutely nonplussed and practically minus—which was the exact condition of the Navy's Oil Reserves after Sinclair and Fall had worked over them with loving care and a few of Deacon Will Hays' Liberty Bonds.

"Wait a minute," cried Alice, hurrying after the Naval Crab, who paused and looked back at her very savagely. "I want to ask you why you keep on saying, 'To hell with everything!' Are you mad about something?"

"What is this, anyhow?" growled the Crab sourly. "A Court of Inquiry? Or a House Investigating Committee of one? Will I never get done answering questions, just because I happen to be a Naval Pilot?"

"Are *you* a Naval Pilot?" inquired Alice in shocked tones—and it took a lot to shock that baby, let me inform you. "Why, how can a Crab be a Naval Pilot?"

"You mean—how can a Naval Pilot be anything other than a Crab, don't you?" inquired that individual, clicking his claws together angrily. He took the picture of a battleship from his pocket and tore it into small pieces, after which he seemed greatly relieved and rested. Then he continued more gently: "I admit I may seem a trifle Crabby now, but I was human enough when first I entered the Navy. I didn't even have halitosis, let alone dandruff—and *now* look at me!" The Crab glared at Alice as he took a bottle of Blisterine from his pocket and doused his head with it liberally according to the directions on the bottle, after which he took a good long swig of the fluid. "We've been reduced to drinking this stuff ever since Josephus Daniels got hold of us," said the Crab, making a wry face and hurling the empty bottle at a passing Walrus dressed in the uniform of a Chief Machinist's Mate.

Alice thought it somewhat odd that a Walrus should be walking through Central Park, but nobody seemed to pay any attention to him or to the Crab either; so she walked along and told herself that it was all quite natural. (When she thought it over afterwards, it occurred to her that she ought to have wondered: but at the time it all seemed natural enough, though she *did* think to herself: "Perhaps I shouldn't have taken that extra cocktail before breakfast; perchance my usual three were enough!") However, she was never one to worry when she was out with the boys, so she tripped along with the Crab, wonder-

ing idly if he would suggest a bite to eat in the Astor. But never a suggestion did he make; he was either Scotch by descent or else he was struggling with some inner grief. At last he spoke.

"Do you know Curtis, Duke of Potomac?" he remarked. "He writes Little Brown Bear Stories for the kiddies and peculiar publicity stories for the Navy. Those stories are great stuff for the mind—they shrink it."

"Well, I'm sure I don't want mine shrunk," said Alice.

"Don't be too sure of that," said the Crab maliciously. "You might want to join the Navy some time—and then what would you do with a large broad mind, eh? You'd have to shrink it or else get rid of it altogether. Perhaps that's the best plan—simply get rid of the thing. You don't need a mind, once you're in. Thinking is only a damn nuisance to a Naval man. Look what the process did to Sims and Magruder!"

"What did it do to them?" asked Alice.

"They started to think things out," growled the Crab, "and the first thing they thought OUT was themselves." The Crab laughed grimly as he turned out of Central Park at Columbus Circle and headed west toward the Hudson. "Would you like to go on a cruise with us?" he inquired with some little hesitation. "I'm on the *Lexington*, our new aircraft carrier—you'd die laughing at some of the aircraft it carries."

"I thought women weren't allowed in the Navy," said Alice, "except in Washington—and only old ones, at that, sailors being susceptible."

"As a matter of fact, they're not allowed," admitted the Crab, winking slyly at a passing flapper. "But we slide a few aboard on the sly. We had four girls on a recent trip—one each on the cruiser *Concord*, the destroyer *Sands*, the repair ship *Dobbin*, and the destroyer *Billingsly*. It used to be that a sailor had a girl in every port. But now he has one in every porthole. That was a good joke on the old Duke of Potomac, the bed-time story teller."

"I suppose you tuned in on some of his stories so the girl's wouldn't feel lonesome in the evenings?" suggested Alice, skipping the gutter nimbly.

"We did," said the Crab. "And what great sleep-inducers those stories of Curtis' are. They'll put you to sleep quicker than a sock on the bean from a sledge hammer. I only hope that Curtis' next series contains plots from that trip—they'd snap the yarns up a trifle, believe me. But here we are at the good craft *Lexington*. It's for carrying aircraft so we call it an air-raft. It rather resembles a raft, doesn't it?"

"It does, indeed," agreed Alice, somewhat shocked at the weird appearance of the vessel, which looked for all the world like a long dock with a city incinerator or garbage-burning plant at one side of it. "Does that thing float?"

"Only just," said the Crab, examining the *Lexington* with every indication of disgust stamped on his features. "You'd think," he continued plaintively, "that one thing like that was quite enough to perpetrate. But they made two like it, and then named one after a brand of potato chips—the *Saratoga*. Holy mackeral! Again!"

He stared in horror at a large crowd of civilians who were rushing about on the carrier's deck, carrying large curved pieces of steel, which they brought up from the engine-room of the ship and threw over the side. Another big crew of civilians were busily engaged in lifting other curved pieces of steel from the wharf to the deck of the carrier.

"What in the world is the matter?" asked Alice, staring in amazement at the Crab, who had burst into tears and was crying into a clam-shell he had taken from his pocket.

"Defective turbine blades," moaned the Crab, deftly catching his tears in the clam-shell. "It was the same on the *Saratoga*. Whenever we started the engine, it came all apart. It was most annoying, most distressing. We glued it together, time and again. But we didn't have the right sort of glue. We asked for Marine glue, and they sent up photographic paste from the Publicity Department. It's all very sad, isn't it?"

The weeping Crab emptied his clam-shell over the side, shook the drops off it, and returned it to his pocket. "I'll need it again in a minute," he remarked sadly. "There's always something to cry over in the Navy. But come—let's see if we can slip aboard without being observed."

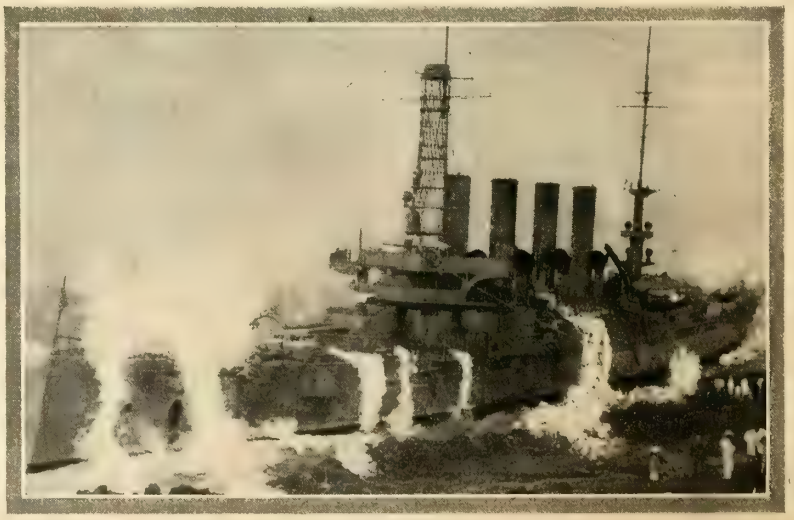
The Crab thrust a turbine blade into Alice's hands and took another himself. "We'll pretend we're civilians," he said. "If anyone sees us working he'll never suspect we're in the Navy."

The ruse worked perfectly. Alice and the Crab walked right past an Admiral and two Captains who were sunning themselves on deck and reading a Congressman's speech on the Naval Appropriations, at which they were laughing heartily. "Ha, ha! That's a good one!" Alice heard the Admiral exclaim. "We're building a Navy to protect our Merchant Marine—and the Merchant Marine hasn't been built itself, yet. Like buying gasoline for your car—only you haven't a car Well, well! It all helps the steel business—choose your own spelling of 'steal.'"

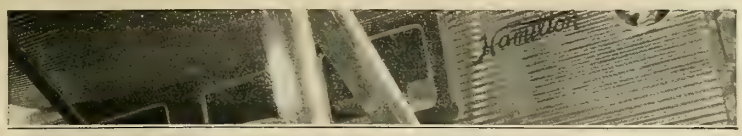
Alice heard no more, for just then a large crew of civilian dock-yard employees came up and threw some more of the ship's turbines overboard. They made a very big splash going over, and looked quite expensive, as everything aboard did look. Everything, that is, except a few visitors—plain American citizens in cheap suits, with income-tax forms sticking from their pockets.

"Right this way," said the Crab, hurrying along the deck and diving down

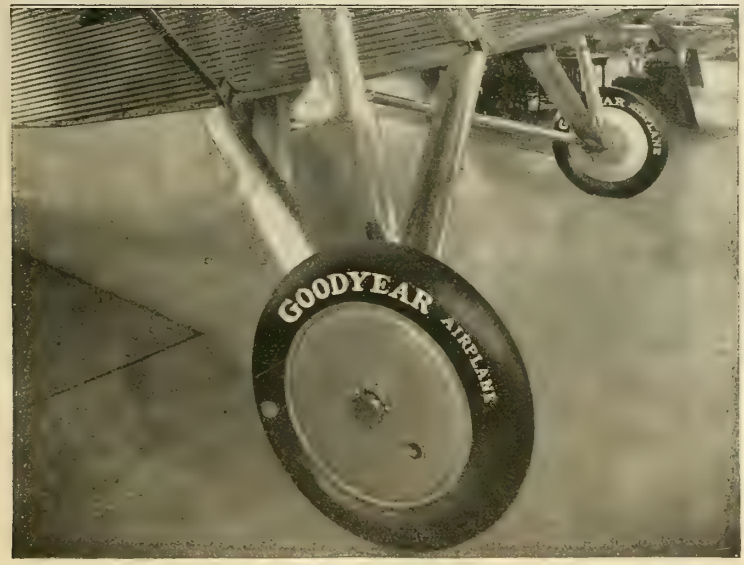
(*Cont. on p. 1030*)



The wreck of the "Memphis" off Santo Domingo.



THE DOUBLE DUTY OF TIRES



THE opened throttle commands airplane tires to be fleet and nimble, to spin easily and swiftly as the ship hurries into flight.

And then, the journey over, these same tires must bear speeding weight and human life to safety as the plane strikes ground again.

Thus, in every flight Goodyear Airplane Tires reveal their agility and their strength. These tires assist take-off performance because they are perfectly balanced and hold their proper pressures. They withstand the punishment of fast or awkward landing because they are built of finest materials by men who know how important tires are to safety.

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AIRPLANE TIRES

INVERTED FLIGHT

The Outside Loop, Vertical Figure "S" and other Experimental Maneuvers, and Physical Reactions and Acrobatics are taken up in this third of a series of articles on Inverted Flight

By

Lieutenant Alford Williams, U.S.N.

SINCE the terms "inverted loop" and "outside loop" have been used, the distinction must be explained.

While the term "inverted" has been applied to the loop described in the October issue of AERO DIGEST, it might also be called an "outside" loop inasmuch as the pilot is on the outside of the flight path at all times. However, it appears to be of greater importance to use such a name in describing it as will emphasize the fact that it is as diametrically opposed to the normal basic loop as is inverted flight to normal flight. And again, there is no desire to upset the original conception of the outside loop.

The commonly accepted idea of the outside loop is as follows: The airplane is first pictured in normal flight. The nose is depressed from the immediate horizon to the opposite horizon in a straight line across the ground; thence back to normal flight. During this maneuver the pilot is on the outside of the flight path. The writer experimented with this evolution and tried it about twelve times before arriving at the method described hereafter. The first attempts involved reaching speeds and accelerations far in excess of those charted for the final method. The airplane was in normal flight with an indicated air speed of one hundred miles per hour, aileron neutral and only sufficient rudder to offset the engine torque. As the throttle was opened to the wide open position, the stick was pushed forward smoothly but decisively about one half the possible traverse. The airplane responded quite readily to the elevator action, until the vertical position had been attained.* Thereafter, the response became increasingly ineffective. The control stick was then pushed still farther forward, reserving a slight amount of the forward stick movement to meet the task of forcing the airplane up the other side of the circle. The air speed had mounted quite rapidly during the downward travel, until a maximum velocity of 246 miles per hour was found to have been reached just prior to the application of full forward stick to force the airplane up the side of the loop. As the airplane progressed to the top of the loop, the speed dropped off quickly until, just prior to the assumption of the normal flight position, it was found that the speed had dropped to eighty-nine miles per hour.

The attempt to perform either of the inverted or the outside loop maneuvers could be rendered ineffective and abortive by a hasty or violent manipulation of the elevator control. A broad arc must be described, and considerable patience must be exercised in handling the elevator control smoothly and decisively to effect a clean-cut performance.

It will be found from an inspection of the accompanying chart, figure four, that a maximum negative vertical acceleration of 3.2 was reached. The physical reaction and discomfort sensed during this maneuver were slightly greater than in the preceding maneuver but did not occasion alarm, by reason of the fact that the pilot had become familiar with what was to be expected. Upon the completion of the first outside loop, which was started with a speed of one hundred fifty miles per hour, then believed to be necessary, the writer was troubled by a slight bleeding from the nose and by such other normal reactions as might be expected, such as a prolonged blank vision period and excessively high head pressures.

It is desired to emphasize again that succeeding efforts to duplicate this maneuver were accomplished with far less physical discomfort. There is absolutely nothing mysterious or dreadful about either of these maneuvers. The standard military single-seater fighters are apparently strong enough to withstand the accelerations, and the normal pilot is also apparently able to accommodate himself to them. The maneuver is simple of execution, and with such excellent airplanes available, it is certain that any service pilot can readily execute either or both of these maneuvers, provided he desires to do so.

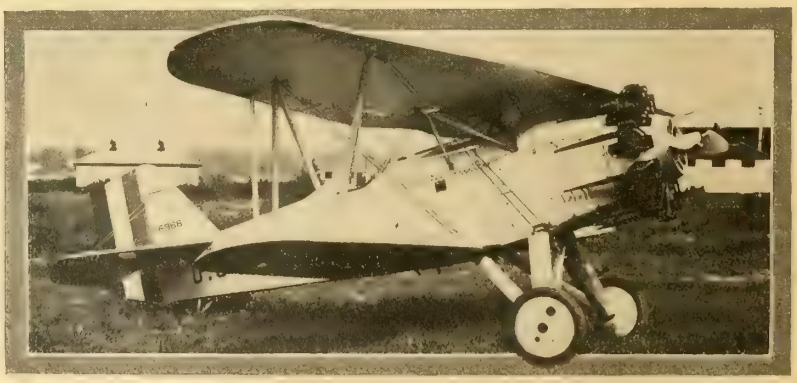
THE VERTICAL FIGURE "S" AND OTHER EXPERIMENTAL MANEUVERS

In an effort to carry the program of investigating variations of inverted flight as far as possible, an attempt was made to combine a section of the inverted loop with one half a normal loop. This resulted in the vertical figure "S".

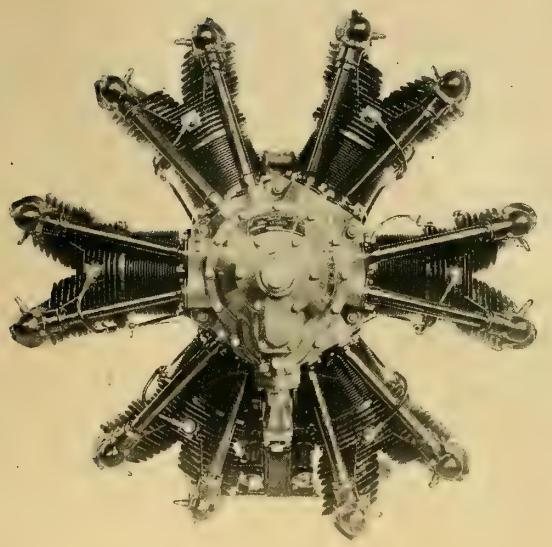
A normal loop was commenced at an air speed of approximately one hundred and sixty miles an hour. When the airplane had reached the top of the loop, it was permitted to remain in that position until the lift had been reversed. The control stick was then forced forward slowly and firmly, causing the airplane to perform the first half of an inverted loop. Upon reaching the normal flight position, the control stick was brought back to the neutral position. This maneuver resulted in a considerable gain in altitude, and it might well prove to be of great value in aerial combat, by reason of the unusual changes effected in the line of flight and the confusion which might be experienced by the pilot of a pursuing airplane.

Efforts were also made to use the first half of an outside loop as a resolution from a continued power

(*Cont. on p. 906*)



The Curtiss "Sea Hawk" (F7C-1) powered with Pratt and Whitney "Wasp"



"It's a good Engine"

"It's a good engine"—That's what our engineering experts promised us when the first Curtiss Challenger engine, all bright and shining, was on the block, ready for its first test run. After one—and two—and three—fifty-hour runs, the smiles of the engineers were a bit broader as they repeated "It's a good engine."

We installed it in a Curtiss "Robin", and flight-tested it for a hundred hours under every condition. The pilots who flew it and the mechanics who serviced it without exception echoed "It's a good engine".

Then Casey Jones flew the Challenger to Los Angeles and back—6000 miles—averaging 100 miles an hour and 11½ miles to the gallon, with no trouble, repairs, or replacements of any kind. And as he stepped out of the plane at Curtiss Field, he replied to our "Well?" with "It's a good engine."

Finally, the engine was returned to our Engineering Department. They disassembled it, examined every part minutely with precision instruments, found it to be in beautiful condition, and chorused triumphantly, "We told you so—it's a good engine."

The Challenger develops 170 h.p. at 1800 R.P.M. It is simple in construction, smooth in operation, reliable and economical. In short—"It's a good engine."

The warm reception accorded the Challenger engine by the industry is indicated by the fact that eight representative manufacturers have already purchased Challenger engines for immediate installation in their aircraft.

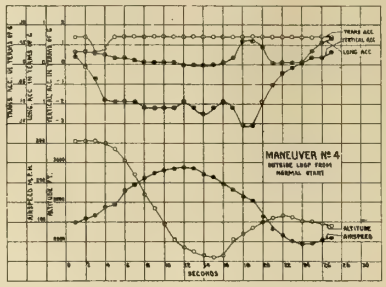
CURTISS AEROPLANE & MOTOR CO. Inc.

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Curtiss

turn of short radius. Aerial combat eventually results in a climbing turn contest, from which either of the contestants will attempt to escape. And a successful exit from such a situation can only be accomplished by a surprise maneuver.

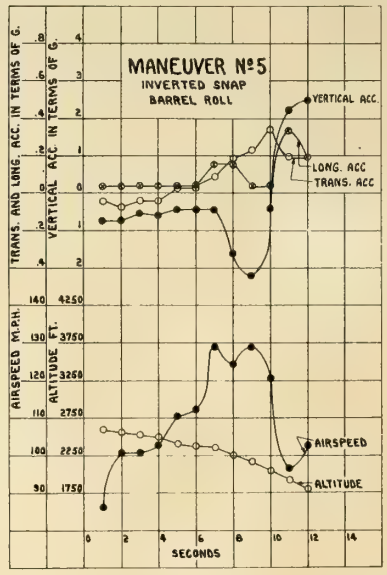
The Hawk was placed in a right hand tight power turn, and an attempt was then made to execute the first half of an outside loop by sharply forcing the control stick forward to the instrument board, applying considerable left rudder to hold the nose of the airplane on the horizon. The rudder was unable to hold the nose up, and the airplane came out of the turn in a dive.



Another effort was made to accomplish the same result by applying full left rudder slightly prior to forcing the control stick fully forward. In this instance, it was found that the initial impulse imparted by the rudder was sufficient to start the nose of the airplane upward by the time the full forward elevator caught hold and violently whipped the airplane out of the right hand turn and into a position where the proper control disposition resulted in a left turn without a loss in altitude. This maneuver holds possibilities which will undoubtedly be developed in detail and practical application in the near future.

The only remaining evolution of normal flight which had not been imitated in inverted flight was the snap barrel roll—a complete horizontal roll effected with a single disposition of the controls. This maneuver is conceded to be of no value in aerial combat, but the accelerations and stresses engendered in its execution are of importance from a design standpoint.

The Hawk was half rolled to inverted flight (power on). At an indicated air speed of approximately one hundred and thirty miles an hour, full left rudder was applied and the control stick was sharply forced full forward and to the right. The whipping movement was violent and was accompanied by considerable physical distress; that is, excessively high blood pressures in the head, clouded vision, and so forth. This maneuver and the accelerations it produces are shown in the graph at the right.



Physical Reactions and Acrobatics

Refinement in flying technique is dependent upon reducing the handling of controls to automatic subconscious movements. The military pilot must, by continual practice, make himself so much a part of his airplane that its direction and course and position become products of automatic action.

The pilot's primary sources of information for determining his position in space are vision, muscle, joint and skin sensations, the vestibular apparatus in the inner ear, and very likely, other physiological functions about which very little is known at present.

Practice and improvement (and therefore accomplishment in flying) become tasks of constantly using the information derived from these sources, evaluating it and according the proper weight to each finding. For instance, the worst feature attending whirling movement, such as is experienced in the spin roll, is the effect after the turning has ceased. The sense of whirling movement continues for some time after the turning has stopped. This sense or feeling is erroneously interpreted as evidence that the motion continues, but in the opposite direction. Thus, upon recovering from a prolonged spin, the pilot has the erroneous impression of spinning to the left. And if the pilot depended upon his semi-circular canals for determining his position and motion in space, he would naturally correct for this false impression and spin to the right again. Successful airplane control and mastery of aerial acrobatics are dependent upon correctly rationalizing and eliminating from consideration such information as may be essentially erroneous. And the capacity to achieve this fine distinction flows only from constant practice.

The writer has been intensely interested in noting the physical reactions incidental to high accelerations. While testing a racing plane some years ago, the comparative effects of reasonably low accelerations of considerable duration and high accelerations of short duration were compared. The first was tested by turning the plane in a comparatively short complete circle at approximately 250 miles per hour. The second was investigated by making the sharpest right angle turn at the same speed.

In the first case, the full effect was not experienced until approximately one half the circle had been completed. From this point on, the physical discomfort became decidedly disagreeable, being accompanied by a marked effect on the vision. In this case the acceleration had been comparatively low but of extended duration.

In the second case, the physical distress did not show up until the turn had been almost completed, and at no time did it reach the degree experienced in the first case. In this instance the acceleration had been rather high but of momentary duration. This is explained by the inertia of the column of blood tending to delay the drainage from the head. The writer is convinced that an acceleration of 4 G extending for a period of two seconds is less disturbing than an acceleration of 2 G of four seconds' duration.

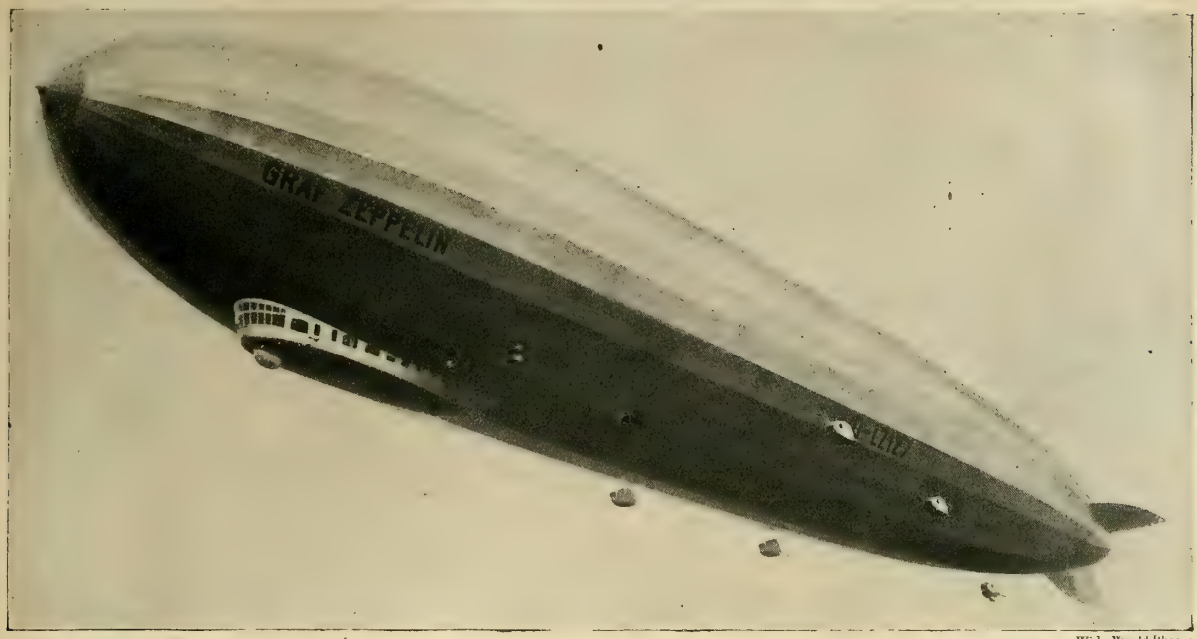
When the inverted and outside loops were completed for the first time, it was estimated that the accelerations had amounted to at least—4 G, and to find that the accelerations recorded for subsequent efforts were slightly in excess of —3 G was surprising.

Whether the human body can accommodate for negative accelerations as well as it can for those of the normal sign remains to be discovered. The writer believes that such will not be found to be the case.

Discussion and Conclusions

At the very beginning of his career as a pilot, the writer was greatly impressed with the expediency and necessity of intentionally and vigorously investigating possible flight maneuvers in order to (*Continued on page 908*)

TODAY THE PROVING GROUND FOR MOTOR OILS IS IN THE AIR



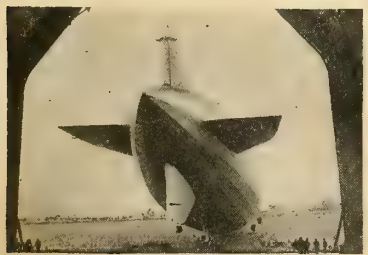
The biggest thing that flies . . . the Graf Zeppelin arriving in the United States to inaugurate a trans-Atlantic air passenger service. Wide World Photos

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New car or old car, drain and refill with the NEW VEEDOL Motor Oil for greater economy, better mileage, and for the same faultless performance that sets records on the road as in the sky . . . Look for the orange and black Veedol sign . . . Tide Water Oil Sales Corporation . . . Also marketers of TYDOL Gasoline.



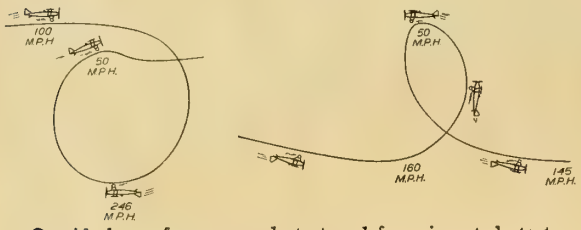
The good wishes of the whole world followed the Graf Zeppelin across the Atlantic

FIVE HUGE MOTORS, OVER 100 CONSECUTIVE HOURS, THE MOST GRUELLING TEST EVER GIVEN A MOTOR OIL.

Say you saw it in AERO DIGEST

prevent being caught in an unexpected position and unprepared to meet it. While it is not advocated that the young pilot be urged to hunt belligerently for trouble in the air, it is contended that anything like complete mastery of flying, as of any other business or enterprise, can be attained only by intensive investigation and study. Timidity is based upon ignorance, and, for that matter, so is too much aggressiveness, but as long as a pilot realizes that there is a certain maneuver with which he is unfamiliar he will be possessed of a decided repugnance against placing his airplane in even close to any attitude which might terminate in that maneuver.

In all maneuvers involving aerial combat and inverted flight, the safety belt plays a very important part, and little has been accomplished during the last twelve years in the way of developing a suitable safety belt. While it is true that the lap type of safety belt will hold one securely against the seat bottom, it offers no protection whatsoever against the fore and aft swinging of the upper part of the body. On the other hand, the Spad type of shoulder strap is not suitable equipment for a single-seater fighter, inasmuch as it restricts the pilot's ability to twist his body for the purpose of obtaining a better view aft. During recent flight tests of a racing airplane, a special device was used which was highly satisfactory. One standard safety belt was anchored to the upper longerons and arranged to traverse the pilot's chest at armpit height. Another standard safety belt was anchored to the lower longerons and traversed the pilot's hips. For the purpose of landing and taking off in ordinary straightaway flight, the upper belt alone was used. This belt offered maximum protection in a crash or in the case of an abrupt stoppage occurring during a landing or take-off. During high speed runs where depressing "bumps" brought about the effect of hurling the pilot from the cockpit, the lower belt was secured. The writer was immensely pleased with this arrangement in that it made him feel that he was one with his machine and part of it, rather than that he was just aboard.

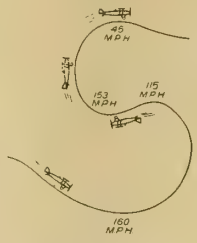


Outside loops from normal start and from inverted start.

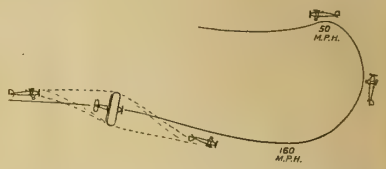
It is not intended to discuss at length the applicability to aerial combat of any portions of the maneuvers described in this series of articles. Neither the outside loop nor the inverted loop could be used in its entirety in single-seater fighting tactics. But beyond question, certain sections of each evolution can be used to advantage.

Assume a case, for instance, where a single-seater fighter is being attacked by another fighter which is diving at great speed. The attacked airplane cannot escape by diving or by running away straight ahead, and must reverse course to avoid fire. To execute a "flipper turn" or an "Immelman turn" will require considerable time and will lack in the element of surprise.

Suppose, however, the attacked airplane maintains its course and relative position until the attacking airplane is so committed to a line of approach that its extreme speed practically negates radical alteration. When the attacking airplane has approached to within twice the range of fire, the attacked airplane could suddenly execute the first half of an outside loop, reach the inverted flight position and, heading in the opposite direction, half roll to normal flight and continue to escape at exceedingly high speed.



Vertical figure S.



Inverted renversement. This maneuver, sometimes called the "Williams renversement" was first accomplished in 1927.

In such a case the attacking airplane must redress from the dive in a climbing turn, and attempt to overtake the retreating airplane, or execute a similar half outside loop, half roll to normal flight, and again reach a firing position. Complete familiarity with inverted flight and its variations will undoubtedly have a marked effect upon pursuit air warfare. Some of the maneuvers are new and at present rather rare, but it must be remembered that the difficult effort of today may perhaps be performed with ease by the novice of tomorrow.

So far as the present type of military and naval single-seater fighting airplane is concerned, it is believed that the factors of safety are adequate and ample to take care of the stresses and strains set up by inverted flight and its modifications already described. The Hawk used for these tests required no special care or realignment.

It is desired to emphasize the value of working out the details of an air maneuver with the help of a small scale model, prior to attempting execution in the air. The writer, from his earliest contact with aviation, has used this method of simplifying the picture of control dispositions and their consequent effects. Should the contemplated maneuver be complicated and involved, it is decidedly expedient to do as much thinking as possible on the ground and carry a clear conception into the air as to just what must be done with the controls. The small model may well be used to advantage by the experienced pilot as well as by the student. Visual demonstration of flight maneuvers by means of a small model equipped with adjustment controls is of unquestionable assistance to the student pilot and should find a prominent place in ground school routine.

** Recent experiments have shown that at this stage a heavy vibration was noted as if the wings were getting lift alternating from the top and bottom. It seems probable that a critical airflow exists at this stage, while the wings are still carrying some positive load at an angle of attack approaching that of zero lift; and when the flow breaks down, the wing moves, temporarily establishing a larger resultant angle of attack, and reestablishes lift, only repeatedly to go through this cycle until the flow has definitely shifted to that producing negative lift.*

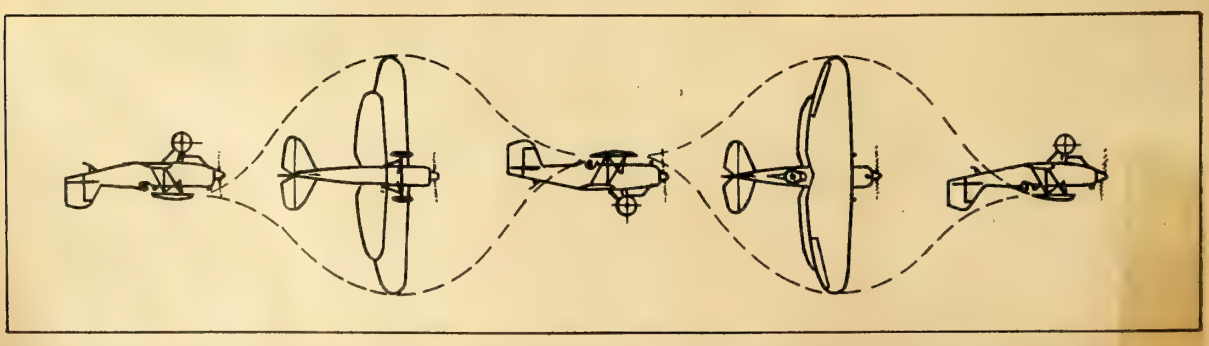


Diagram of the inverted snap barrel roll, as far as known never accomplished except by Lieutenant Al Williams.

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THE MORNING AFTER

By Don Rose

THE country has been off on an emotional jag, and at the moment that this article appears is just getting ready to repent of it. It's the morning after a presidential election, and now it is all over but the shouting. Just who is going to do the shouting I really can't tell you at this distance, but personally I don't feel that either party to the argument has a whole lot to shout about. And concerning the gentleman who is now looking up railroad fares to Washington and making arrangements with the electric company to change the White House meters to a new name, beginning next March, I have nothing at all to say. A great deal too much has been said already.

Most of us are now looking at the majorities here and there and wondering what became of that vote which weighed so heavy on our conscience during the past month or two. When we were laboriously making up our minds what to do with our ballot, we felt it was a really important matter. Now we look at a majority of 10,000 or 100,000, and can only suppose that our share is represented by one of the zeros. And when we stop to wonder what would have happened if we had voted the other way, we find ourselves simply appalled at the very idea.

Politics is not very different from that other periodic affliction that comes around our part of the country—the seventeen year locusts. There are some of them around all the time, but every so often there are entirely too many of them. They buzz and hum and keep us awake nights; they chew the edges off the scenery. They sound very important and seem liable to go on forever, until a cold night comes along and they are suddenly silent. Inside of a week we have forgotten all about them.

Politics is a mild case of intermittent chills and fever. It is very much like the circus, including all the brass bands and the calliope, which seems for a while the most important thing in the world but fades into forgetfulness when the dust dies down at its departing heels. You have to admit that most of us behave in a presidential year pretty much the way we used to when the circus came to town in the days of our infancy. We quit work to watch the parade, we volunteer to carry water for the elephant and the donkey, we laugh at the clowns and rubber at the freaks. We waste a lot of time watching the show through the peepholes of the daily papers, and we hang around the dressing rooms in the hope of getting a close-up look at the chief performers.

And at last the circus moves on and away and things are about the same as before. There's a lot of dirt left around, a lot of posters and placards, a lot of peanut shells and paper bags. The serious people in town begin to wonder what became of all the money, and the rest of us begin to wonder what all the excitement was about.

This year's campaign was a little better than most of them. As a rule a political campaign consists of two brass bands playing the same tune in slightly different keys, which does not create a very happy effect for the innocent bystanders. This year we could at least tell the candidates apart. Not that this really helped as much as might be expected. Whenever I go into a voting booth to cast my vote like a free citizen, I find myself facing a list of names which mean nothing in particular to me or anybody else. Most of them are people whom I don't know from Adam, and I should at least know Adam if I met him on the street. The bigger boys on the list, of course, have had their pictures in the papers and movies and have talked my head off through the radio loud-speaker. I have been told that one of them is very fond of his mother and another can do odd jobs around the farm without milking a cow on the wrong side. But it really doesn't help me to cast a sensible vote to know all this, and I simply can't get excited over voting for a man because I like his whiskers or because he can pitch hay.

The principles of party government are supposed to give me an easy way out of this difficulty. Party government explains why a blue-eyed bartender in Philadelphia is a Republican, while his red-headed brother in New York is a Democrat. The principal difference between the parties in most places is that one has the anxious air of people trying to stay in office and the other the greedy air of people trying to get into office. Both sides spend a lot of other people's money to feather a soft nest, and half of them get away with it. The other half have a mean job explaining what became of all the money. And as regards those who fill the campaign chests, it seems to me that one way to get the minimum satisfaction out of spending money is to contribute it to the campaign fund of a defeated candidate.

A month ago most of the voters in this broad land agreed on only one point. Both sides of the argument were certain that the election of the enemy would wreck the country, morally or financially, or both. Fortunately it isn't so. It might be so if politics were half as important as it seems to be when the argument is on. But a small dose of experience tells us that the country lives on a steady diet of business, energy, and enterprise which has nothing to do with politics. History tells us plainly that nations have rarely gone to pieces because of political blunders or even bad management, but have often done so for the lack of simple energy and the will to work at the ordinary business of living. A loafer population is a worse handicap than all the thousands of politicians who run rooting around pork barrels. The fundamental strength of America lies neither in the Grand Old Party nor in the Jeffersonian principles of Democracy, whatever they may be. America lives and endures because her people have work to do and are willing to do it.

This spirit survives most of the chances and changes of political upheavals. It has done so before—many times—and it will do it again. Moreover, there is another saving fact which keeps even politicians from doing much damage. The job is usually bigger than the man. The job is protected by custom and necessity, by tradition and experience, by the fact that the people expect that it shall be done well and done in a reasonably familiar fashion. The political poppycock which is spread far and wide before election fades away to a whisper when the elected representatives get into their harness. The job has the weight of America's history and experience behind it, while the man who gets the job is just another of those things. So the job wins out, nine times out of ten. And a big job often does more than that, and works a sort of magic which makes a real man out of a natural born peanut.

So whether I win or lose the brown derby, which is my personal stake in this election, I'm not lying awake nights worrying about the fate of the nation. When I look over my history books and see what the nation has survived already, I doubt very much whether either Mr. Hoover or Mr. Smith can do it any permanent damage. It calls for the united asininity of

(*Continued on page 1038*)



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THE SPINNING OF AIRPLANES

By
Dr. Michael Watter

THE toll of life taken by accidents to airplanes due to spinning has for several years been the cause of great concern to pilots, scientists and engineers, and many efforts have been directed toward explaining and mastering this dangerous phenomenon.

Some pilots have contributed to a solution of the problem by courageously testing dangerous airplanes, and engineers by systematic mathematical investigations. Some important deductions were arrived at, and it is the purpose of this article to give a general picture of the problem by means of a non-technical presentation of the phenomenon.

Spinning is of particular interest to designers of military aircraft because it is considered by many as a desirable and valuable manoeuvre in combat. This viewpoint is not held by all the experts, for some contend that spinning has but little if any military value and should be abandoned as a manoeuvre. Whether spinning is or is not of value in military combat, as long as spinning is possible, the aim of designers is to understand it thoroughly and to give pilots definite means of recovery from the spinning. I mention *recovery* and not *prevention* because when the plane is in the spin the dangers involved are real and immediate, and it is the complete knowledge of this phase of behavior which will lead to the mastery of the whole phenomenon. Prevention means control at low speed, and it seems logical to assume that, when means of recovery are found, they in themselves may provide powerful means for preventing spinning.

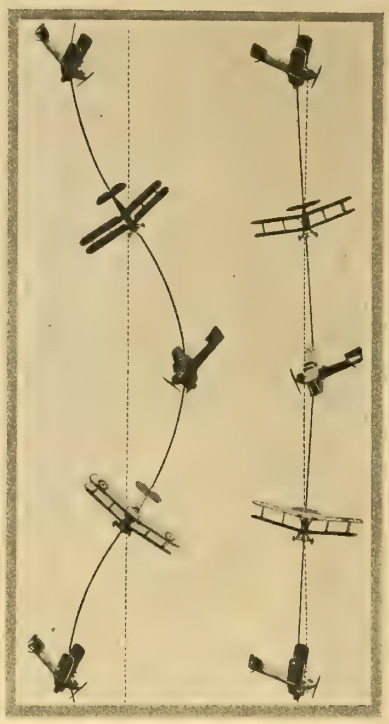


Figure 1

Formerly, spinning was thought of as a certain unstable motion for which no recovery was possible, but in the light of tests and analyses, it was found that spinning presented a steady motion of rotations and that the real dangers are in its stability. It was also found that recovery required a certain movement of control and a considerable loss of altitude, which explained a number of the accidents.

Spinning can take place under such a variety of circumstances and attitudes, which in themselves may differ widely in different airplanes, that no such thing as "the spin" should be considered but the problem should be viewed with more latitude. In a normal spin the center of gravity of an airplane describes a helical trajectory with a radius equal approximately to the semi-span, and the general attitude is well down by the nose. This attitude usually impresses a layman as if the plane were diving along a steep spiral path, but a simple observation will easily disprove the impression. It is sufficient to note the relatively slow speed of descent of the spinning craft to realize that the airplane is in an attitude presenting a very high drag and that the effective angle of attack, i.e., the angle of attack in relation to the relative wind, is consequently very high. A mathematical analysis could easily prove that the airplane has passed its stalling angle, and the angle of attack is usually about 30 degrees to 40 degrees.



Figure 2

As the visible inclination of the body decreases, the rate of rotation increases, the effective angle of attack increases, and the plane enters into regions of "flat" spin with a radius of helix of only a few feet. (Figure 1.)

In order to understand spinning, it is well to review the so-called autorotation. It is a property of symmetrical bodies invested by a relative wind to autorotate when once given an initial rotation. It would be natural to explain this property by pointing out the impossibility of building a perfectly symmetrical body, but this can be disproved by causing such bodies to autorotate in either direction depending on the direction of initial rotation. An experiment of this type can be made with a rectangular piece of cardboard. If it is released and allowed to drop without an initial rotation it will descend almost vertically, while if it is given an initial rotation about its longest side, it will descend spinning and its trajectory will be noticeably inclined. I suggest this elementary experiment because, in analyzing the spinning, too much attention is being paid to the wing combination, when, as a matter of fact, *any* part of the airplane may and does contribute to the spinning. In analyzing the behavior of wings, it was found that a wing, mounted symmetrically in the wind tunnel on an axis along the wind (Figure 2), soon after the angle of stall is passed, displays an autorotational tendency which, prior to that at angles below the stalling, is damped by the air reaction. After the angle of attack has been increased to about 30 degrees, the autorotation can be caused only by a certain comparatively great initial rotation. At angles of attack greater than about 40 degrees, the airfoil reverts to the same behavior noted below stalling angles. The region immediately after the stalling angle is called the region of spontaneous autorotation, while the second is the region of latent autorotation.

In the case of a biplane arrangement, the first region retains its character, while the second becomes a function of the cell arrangements. In the case of positive stagger, the cell behaves somewhat as a monoplane, while in case of zero or negative stagger, the second region may also become spontaneous and remain so up to very large

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angles of attack. The explanation of this phenomenon lies in the configuration of the lift and drag curves of the airfoil or cell, but it is outside the scope of this article to go into this analysis.

The fact that in a spin the axis of rotation is nearly coincident with the direction of velocity suggests that the autorotation of the cell is the main contributing cause of this type of motion. This viewpoint is held by many, but it is my belief that, although the rolling couple may contribute to the entrant motion, its effect in an established steady spin may be considerably smaller than the effect of the complete unit of wings, body and tail surfaces. The autorotational properties of the cell may be one factor in the spinning characteristics of an airplane, but an airplane may not display any steady spinning tendencies with a cell having autorotational tendency. In fact, it may display it with a cell not having any pronounced autorotational couple, depending on the mass distribution and disposition of stabilizing and controlling surfaces. *The spinning motion is a combination and balance of aerodynamical and purely dynamical forces and couples, and simple aerodynamical tendency is but one factor in it.*

Sideslip may be very pronounced in a spin, and in that case, the rolling due to sideslip will greatly influence the rate of roll of the simple autorotational kind.

The study of the geometry of spinning may lead one to doubt the presence of sideslip or to attribute to it only secondary significance. Full scale experiments, however, prove beyond doubt the presence of a large amount of sideslip, which cannot be neglected in a detailed analysis of spinning. Quoting from the R and M 1001 by Messrs. Gates & Bryant: ". . . . the final appeal in this matter is to a full scale experiment in which a large sideslip is observed beyond a vestige of doubt. . . . Thus it is dangerous to assume anything more than a very loose connection between autorotation and the equilibrium conditions in a spin."

The rolling of the wing or cell leads to a yawing couple, which may or may not be of the same sense as that due to the body and tail surfaces. It appears that, up to an angle of attack of about 30 degrees to 40 degrees, the magnitude of the yawing couple due to the body and tail unit predominates and the resultant yawing of the airplane is opposite to the yawing of the wings. Above these angles the shielding of the tail surfaces becomes more pronounced, and consequently the effect of the yawing moment becomes more dangerous, tending to keep the craft in the spin despite a probable yawing couple due to the body's tendency to check it.

In addition to rolling and yawing couples, there are also pitching couples present of which one, normal to the high incidence condition, has a tendency to depress the nose of the airplane. The damping couple which is due to the component angular velocity in pitch may, however, have a tendency to raise the nose, and apparently this occurs in fast spins.

A relative magnitude of the moments of inertia, of the masses or the ellipsoid of inertia of the airplane, is of the utmost importance in spinning. Since the axis of rotation in spinning does not coincide with any of the three principal axes of the airplane, there are three gyroscopic moments present which are functions of the components of the angular velocity and moments of inertia.

The distribution of masses and rate of rotation influences the gyroscopic stalling moment, and the principal danger in spinning lies in the relative magnitude of this purely dynamical moment, because the stalling attitude of the airplane with its consequent shielding of tail surfaces is a necessary condition for spinning stability.

In dealing with the problem of gyroscopic moments, it is important to consider the effect of a rotating propeller. With the present heavy metal propeller rotating at a considerable angular velocity, its gyrocopic action is important even when idling and of great magnitude when the pilot attempts to recover from a spin by putting the power on. Depending on the sense of rotation, the gyroscopic action of the propeller may be such as to tend to raise the nose of the craft still more, thus increasing the rate of rotation of the airplane. When the sense of rotation of the airplane and propeller is opposite, the switching on of the power will cause an undesirable pitching moment leading to a flatter and faster spin. This point is of great importance and may be the explanation of a number of accidents.*

Having reviewed the aerodynamical and dynamical causes of spinning, we can turn our attention to the problem of entry into and recovery from a spin.

The entry into the spin can be subdivided into voluntary and involuntary depending on whether the pilot intends to execute a spin or must face it as a consequence of peculiar behavior of his craft under certain conditions.

The main necessary condition for a spin is the stalled attitude of the airplane. Involuntary spin may occur when flying at nearly stalled attitude in attempting to execute a turn: the yawing moment due to the normal ailerons and passing of the burble point on the side which is raised may cause the spin. A similar case may occur when climbing; a sudden stopping of the engine causing the loss of speed while the plane has very high angle of attack will result in rolling instability and a spin. The latter case precludes the possibility of correcting the spin by decreasing the power of elevator. The voluntary entry is made by pulling the stick back to attain the stalling attitude and then applying the rudder and ailerons or either of the two. The control movement is the direct consequence of the aerodynamical behavior of the airplane; first it is brought to the attitude of rolling instability and then caused to rotate by application of either or both of the lateral controls.

Recovery is attained by returning to the pre-stalled attitude and stopping the rotation. To do this the pilot pushes the stick forward in order to lower the nose of the airplane and then neutralizes or reverses the rudder. If the sense of rotation of the airplane is the same as that of the propeller, he may put the power on to expedite recovery, but if it is not, engine power, in my opinion, should not be applied, particularly when a heavy metal propeller is used.

While spinning, if the pilot feels sudden reverse of load on the control stick (that is, if the stick is being kept back by the air force on the elevator), he must consider this as a danger sign indicating a change into the region of highly stalled flat spin, and he must immediately attempt recovery. The controls should not be "pumped," but the pilot must bear in mind that in modern planes the altitude required for full recovery may be as much as 2,000 feet.

Because of the highly stalled attitude of the airplane in a spin and of the low speed of advance, the action of control surfaces is very ineffective. This is particularly true in reference to the stabilizer and elevators. The inefficiency of the rudder mainly results from the shielding effect and the interference due to the body and horizontal tail surfaces. The action of the ailerons does not seem to have been sufficiently studied, and in general, pilots have attached very little significance to their effect. In entering the spin the ailerons contribute a large rolling moment, but once in a spin, with high angles of attack, the pilot usually feels that their effect is negligible. Whether this

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is true or not cannot be decided without further data, for it is quite probable that during a spin aileron action is confused by many pilots with other controls. It has been observed that, in reversing the ailerons so as to oppose the spin, the rate of rotation is not only undiminished but often further increased.

The dangers involved in spinning may be divided into four groups: (1) mechanical; (2) structural; (3) physiological and (4) flying. Mechanical causes include aerodynamical and dynamical behavior of the airplane.

(1) Certain planes which are hard to bring into the spin and which have no tendency to fall into an incipient spin were found to behave dangerously once they were put in a spin. It is such planes that have a tendency to go into a flat spin, and the recovery in such a case is handicapped by insufficient power of control which is necessary to counteract the dynamical stalling moment of the airplane. The centrifugal force at times is so great that certain cases of non-recovery may be due to the pilot's inability to push the stick forward.

(2) Structural dangers may be due to excessive stresses developed as a consequence of rolling moment and centrifugal forces. Other stresses are quite low, and the accelerations recorded do not exceed 3g.

(3) Physiological dangers are due to the dizziness of the pilot resulting from continuous rotation and rotating field of view. The rotation also influences the semi-circular canals of the ear, thus affecting the pilot's sense of balance.

(4) Flying dangers consist in spinning at low altitude, putting the power on when the gyroscopic movement tends to build up the incidence and not waiting until the controls become effective, but attempting to pump, and finally not realizing that recovery in a modern military plane may require the loss of 2,000 to 3,000 feet altitude.

Having reviewed the phenomena of spinning within the limitations of a non-technical article, let me recapitulate the main highlights of spinning as I view them.

The mastery of spinning lies in a reliable means of recovery and not in the prevention of a spin. The problem of spinning is just as much a problem of dynamics as aerodynamics. The dangerous spinning tendencies of modern airplanes are primarily due to the general trend in design. High speeds attained with present airplanes necessitate a heavy loading per square foot of wing area, heavier structural weights, and the desire for high manoeuvrability ordinarily leads to shorter fuselages. The requirements of service, be it military or commercial, necessitate a deep fuselage with the consequent shielding of the tail surfaces at the high angles of attack associated with spinning. Aerodynamical arrangements of the wing cell have only a secondary influence in the persistency of spinning, although they do have a contributing effect in entry into spins.

The center of gravity location is not of such importance as some may deem it.

The monoplane which aerodynamically has no dangerous spinning tendency may be dangerous in spinning because of dynamical distribution of masses and probably also because of disposition of control surfaces.

A modern American military plane having a highly staggered cell was spun in an attempt to prove the beneficial effect of stagger. It was fortunate that the proof was not carried too far and that the pilot had enough altitude to allow him to recover from the spin, for in spite of the pronounced stagger, recovery was accomplished only with great difficulty.

Another well known plane which spins normally as a landplane spins even faster as a seaplane, despite a more forward location of the C. G. in the latter. This is a direct proof that the dynamical disposition of masses is more important than the aerodynamical arrangement of the cell.

Another matter of importance is the disposition of control surfaces leading to lack of control because of their mutual shielding and effect of the body. In my opinion, increase in size of stabilizing and controlling surfaces is only a temporary remedy and it would be by far more efficient to study some new disposition of controls to increase their efficiency. In this respect the wind tunnel could contribute considerably by affording means to study the airflow near the tail surfaces, by means of smoke and flow investigation. It is difficult to say just what would be a desirable rearrangement of the tail surfaces, but a higher location of the horizontal tail similar to the arrangement often used for seaplanes would seem to be efficient.

It would be interesting to investigate the possibility of using automatic leading edge slots on the horizontal tail surfaces. It is a generally accepted fact that the present sizes of horizontal tail surfaces ordinarily used on modern designs are ample to take care of normal flying conditions, including adequate control at low speeds. The standard sizes and disposition of tail surfaces are, however, often insufficient to overcome the precessional pitching moment, and it has been suggested that the average size be increased by about 30 to 40 per cent to provide for this emergency. The automatic front slot suggests itself as a logical remedy, because in normal flying the tail surfaces would still be unchanged, while for emergency there would be an effective increase of tail surface of almost 75 to 100 per cent, because the slot would actually act as a front slot with flap in which case the elevator would act as the flap.

While high angles of attack are ordinarly a hindrance in the use of front slot, in spinning the effective angle of attack of the tail is high, thus presenting another advantage in the use of the automatic slot.

It may be desirable to provide the front auxiliary airfoil with a simple locking device so as to be able to resort to the front slot action only in case of urgent necessity.

As regards the relative importance of the horizontal and vertical tail, it is my opinion that the rudder action is of utmost importance in spinning and that efforts should be directed to increase its efficiency by preventing its shielding. It may be possible, by a proper forward inclination of the rudder axis, to prevent its shielding, and also this may lead to an increase in its control power because of more efficient attitude in reference to relative wind. A forward inclination of the rudder axis will also contribute somewhat to the aerodynamical diving moment.

The spinning of airplanes presents a complex problem the study of which is further handicapped by the limitations of tunnel equipment and the individuality of behavior of various airplanes. Engineers may claim, however, that the main underlying principles of this motion have been grasped and real dangers separated from the unreal mysterious causes. It remains for systematic investigation and experimentation to equip us with more definite facts which will provide the necessary material to predict beforehand the characteristics of this particular motion of airplanes.

* EDITOR'S NOTE: *Since Dr. Watter's article was written, an accident has occured which appears to bear out his contentions regarding the spin. A Junkers monoplane crashed on October 18. The pilot is reported to have made the following statement in explaining the cause of the accident:*

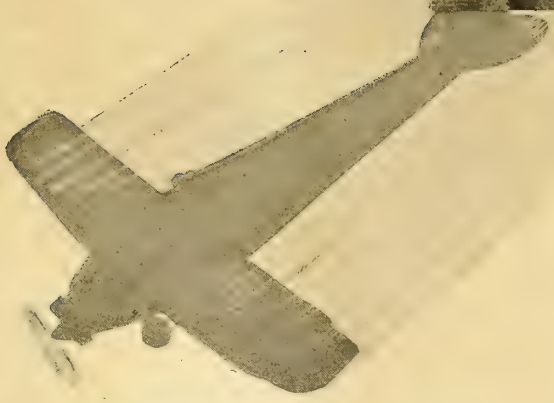
"I banked and the plane went into a tail spin. I do not know how we went into the spin or why. I advanced the throttle and the spin became a power spin, and with our weight it was impossible to come out of it at that altitude."

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PROF. L. M. GOULD

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POSITION FINDING BY MEANS OF STAR ALTITUDE CURVES

By

Lieutenant Commander P. V. H. Weems, U. S. N.

ON August 7, 1928, the writer gave a lecture before a class at the Seattle Flying Service, Seattle, Washington. After the lecture, all hands climbed out on the roof and, using the new star altitude curves, an aero-chronometer rated to start time, and a Bureau of Standards type bubble sextant, worked out several problems using Polaris and Arcturus. The actual problems as worked are shown in the accompanying diagram. The total computation for four "fixes" is given below:

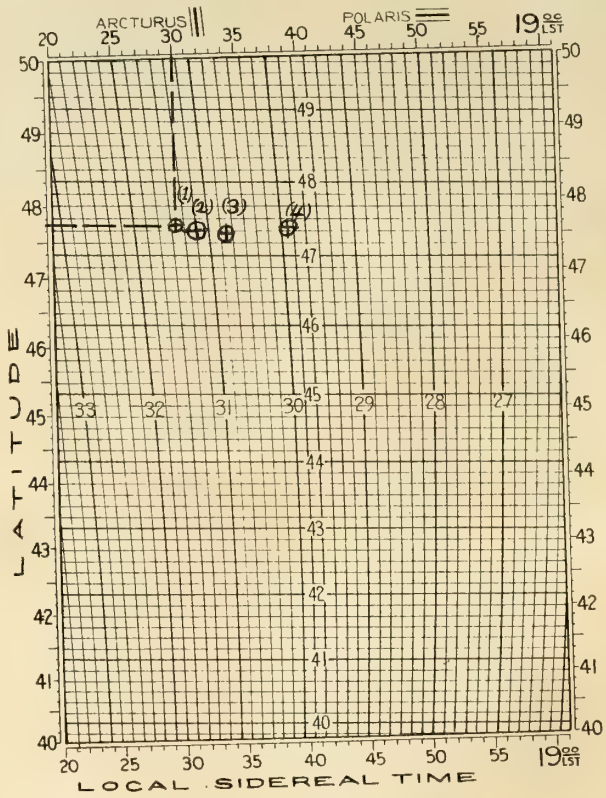
		(1)	(2)	(3)	(4)
Watch	GST	2-40-10	-42-21	-43-36	-50-00
Scale	LST	18-30-00	-31-30	-34-00	-39-15
	Long.	8-10-10	8-10-51	8-09-36	8-10-45
	or	122-33W	122-43W	122-24W	122-41W
	Lat.	47-45N	47-40N	47-36N	47-37N

In these problems GST means Greenwich sideral, or star time, and is shown by the aero-chronometer direct. LST means local sidereal time as shown at the top or bottom scale in the diagram. The only data observed were the times and the altitudes of the stars. Time was taken on Arcturus only, since the altitude of Polaris is practically stationary over the time of observations.

All the curves running nearly vertically are altitude curves for Arcturus. The curves running nearly horizontally are the altitude curves for Polaris. The altitudes as observed by the bubble sextant were not corrected or even written down, but were recorded by a pencil mark on the curves at the proper altitude as shown in the diagram. In working the positions, the point of intersection on the curves was projected vertically to the top scale to get the LST, which, when subtracted from the GST as shown by the watch, gave the longitude in time, which was in turn converted to longitude in degrees and minutes.

The point of intersection on the curves projected horizontally to the left scale gave the latitude direct. No correction whatever was made to the altitudes as shown by the sextant, since the refraction was allowed for on the curves as constructed, and since dip does not enter into the problem when a bubble sextant is used.

The true position of the L. C. Smith Building is approximately Latitude 47-36 N, Longitude 122-20W, which is only a mile or so from the school. It will thus be seen that the latitude was in error about as follows: Position No. (1) 9 miles north, (2) 4 miles north, (3) O. K., (4) 1 mile north, an average of less than 5 miles. In longitude the errors were about as follows: Position No. (1) 13′ west, (2) 23′ west, (3) 4′ west, and (4) 21′ west, or an average of about 15′ or about 11 miles, making an average error of position of about 12 miles—which was pretty bad for an observer sitting still. It will be noted that most of the error was in the longitude which depends on the time. It is, therefore, more than likely that the watch was a few seconds too fast, since all the errors in longitude fell to the west. Also, part of the error shown in the latitude might be due to the fact that the latitude as taken from the chart was in error. In fact, no special effort was made to get accuracy, the idea being to demonstrate the speed and ease with which a fix can be worked. It will be noted that four sights were worked in less than ten minutes, an average of less than two and a half minutes, and part of that time was used in explaining what was done.



The "lines of position" on this chart are laid down on a Mercator projection, with the latitude on the sides but with longitudinal parallels replaced by the time scale

In the construction of the curves, each curve is really a "line of position", i.e., a line on which the observer's position is known to be located. This line is laid down on a Mercator projection, with the latitude on the right and left side as on an ordinary chart, but with the longitude parallels replaced by the time scale. Since the "fixed" stars move slightly, the curves were constructed for January, 1931, which permits a maximum error due to the motion of the stars of about 2.5 miles. It will be noted that no mention of logarithms, right ascension, declination, hour angle, or dead reckoning position was made; in fact, the most important feature of the curves is that they get away entirely from the long and tedious computations necessary when the spherical triangle is solved *(Continued on page 1026)*



A New Criterion in Speed and Luxury

COMPETITIVE time-schedules—airports and routes at high altitudes—the ever-increasing tendency toward more complete electrical accessories, navigating instruments and luxurious equipment—those are some of the factors that have created an urgent demand for super-efficiency in design and super-engine-power *such as delivered in the Fokker Super-Universal.*

This plane has already influenced the general field of single-engine cabin monoplane design—another proof of Fokker leadership. Flying at 140 miles an hour, with immense reserve power and a climb of over 1,000 feet per minute, and controlled with characteristic Fokker ease and stability, *the Super-Universal has set new marks in commercial service* that no other cabin plane in its power range has equaled.

In addition to the experience of many private owners and transport lines, the recent swing around the nation flown by Capt. Haynes in Commander Byrd's Super-Universal proves beyond question that *here is a plane combining all the established Fokker features in a new criterion of speed and luxury.* In all load carrying and speed tests made during the six weeks' journey, even at Mexico City, with an elevation of 7,400 feet, the Super-Universal behaved with a perfect performance record. In over 25,000 miles of travel visiting 40 airports previously unknown to the pilot, less than $25 was spent on repairs to engine and plane.

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PERSONAIRLITIES



by Caldwell

THE dashing birdman sitting in the war relic, an SE5, is Captain Charles Roosmale McMullin, formerly of the Skywriting Corporation of America, and now flying for Fairey in England. That middle name of Mac's is a hot one, eh? Roosmale! He was an old uncle of Mac's, and he had a wad of money—hence Mac's hopeful parents went and named the infant after uncle, who was a bachelor at that time. However, uncle only remained a bachelor until the first observing blonde noticed him, when he went into a spin and crashed into matrimony. He lived just seven more years and had seven kids—so all he left Mac when he passed out was a memory.



C. R. McMullin

Last August Mac did some more of his old smoke writing in Europe. He flew to Vittoria, in Spain, stopping three days en route at Biarritz—trust Mac to pick good spots. From Vittoria he flew across France, Belgium, Germany, and Poland to the Free State of Danzig and East Prussia, where he did some skywriting in German—I understand they write it in foam, over there.

Mac's a young man but an old timer. R. A. F. during the war, then instructing the Chinese Air Force until the Chinks cracked up the last plane, then flying in the States for three years, and now back in England and still at it. Also, while he was here he married a nice little girl from the South—a little girl with a real Southern accent. To hear Loretta talking Mammy talk and Charles clipping along after the manner of a P. G. Wodehouse character is a treat for anyone with sore ears. That hands across the sea stuff is fine for international good-will, but it makes a peculiar phonograph record.

AL. MAJOR, president of Major Aircraft Co., Atlanta, Georgia, sends me an account of the flying activities of a very remarkable man, W. W. Gordon, Jr., of Savannah, Georgia. Mr. Gordon, who is totally deaf, and who was taught to speak scientifically, is perhaps the first man in the history of aviation who has successfully soloed under such a handicap, overcoming what heretofore has been considered an insurmountable obstacle. Dumbness never has been considered a bar to flying—in fact, if a man contemplates stunt flying at low altitudes, wing-walking, or ocean flying in landplanes, dumbness is a distinct advantage. But total deafness has been considered to unfit one for flying, until Mr. Gordon took instruction from Lieut. Robert H. Lowell of the Savannah Flying Club, then made a perfect take off and landing, and several flights thereafter, proving that the deaf can fly as well as the dumb—and better than some dumb ones I know.

The regulations of the Department of Commerce do not permit that a private license be granted to deaf pilots—though if the deaf man can fly, I can see no reason why he should not be allowed to do so. When you sit behind any engine over 200 h.p., you might just as well be deaf, so far as hearing another plane goes. (With some of these new little engines there is so little going on that you may easily hear a crow flapping his wings and croaking or cawing softly to himself as he forges past you.) And so far as listening to the motor goes, a deaf man is extremely sensitive to vibration, and would instantly detect a falling-off in revs or any irregularity of running. Secretary MacCracken has the right to grant a waiver in cases of physical disability, if the applicant for a license can show by his flying that the disability does not preclude safety in flight. Best of luck to you, Mr. Gordon—I hope you get your license.

COLONEL ART GOEBEL, one of the survivors of the Dole Flight of unhappy memory, and who has distinguished himself since in more useful and sensible ways, recently carried a Japanese Robin from Los Angeles to St. Louis, and presented it to Major Wm. B. Robertson, of the Curtiss-Robertson Airplane Mfg. Co. as a mascot for the factory. This bird, which is very beautiful in coloring and about the size of a canary, is a gift of Harry Sperl, California distributor of the Robin. It is now in the offices of the company in St. Louis, and will probably be there until someone opens the door of its cage. I can't imagine a bird that started life in California being content to live in St. Louis—hundreds of birds who started life in St. Louis have since made their pile and moved to Los Angeles to keep an eye on the movie bathing beauties.



Maj. Wm. B. Robertson and Col. Art Goebel. Goebel presents Robertson with a Japanese Robin bird.

Perhaps I should mention that Goebel didn't make that long flight simply to tote that little bird—he just happened to be flying to St. Louis, and brought the bird along. If I hadn't told you that, you mighn't have known—so many of these long flights have been made for no greater reason, and some for no reason at all.

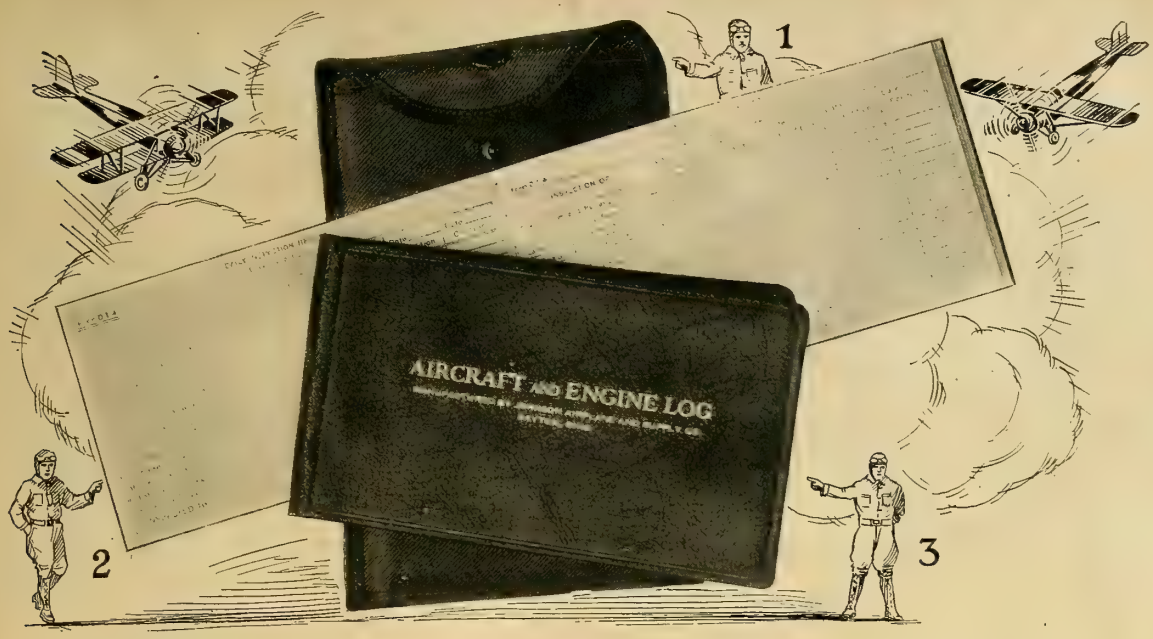
YOU may recall my mentioning some time ago that a bird went up and did a flock of loops—some 500 or so all in a bunch, or one after the other, or however it was. Anyhow, it advanced aviation just that much; and you all write your own ticket on how much. Well when I was out in Fargo, North Dakota, last summer, I ran into that loop merchant, and here he is—Pilot Lyle Thro. You can see from the picture that he's simply standing there with a puzzled expression on his face, trying to figure out why he did it. In his sane moments he shoves a Fairchild over the route from Fargo to Minneapolis for the Mid-Plane Sales and Transit Co. That line, by the way, should become very popular with Rotary and Kiwanis Club members, for it passes right over Sauk Center, birthplace of Sinclair Lewis, who has so endeared himself to the Babbitts of this fair land. I flew over Sauk Center myself, and I can easily understand how Lewis came to write Main Street. It was the obvious thing to write.



Lyle Thro

The king of all loopers to date, by the way, is Speed Holman. I tried to get a picture of Speed, but my camera wouldn't stand the strain. I snapped him, all right, but when I developed the film all it had on it was a surprised look. Speed and Mrs. Holman are a couple of real good sports. They threw a fine party for the National Air Tour folks, and at nine o'clock next morning, when the tour moved on to drink their way through the next town, there was charming Mrs. Holman down to see them off—and she still wearing her evening gown!

(*Continued on next page*)



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Edwards and Kandie—"Down on the Farm".

(*Person.AIRlitics continued*)

THIS beautiful pastoral scene shows Major J. Paulding Edwards of DeBeque, Colorado, and Pilot Maurice W. Kandie, of Meeker, Colorado, congratulating each other on their nifty descent among the barnyard dwellers of the Great Open Spaces—which were not quite as open as they might have been at this spot. Kandie and Edwards were taking off for a flight to DeBeque, and were carrying a heavy load of gasoline and supplies. That weight, added to the 225 pounds of contented Western beef that comprises the well-cushioned Edwards, proved just too much for the little plane. It flew four miles at a height of 75 feet, noticed the steep bluffs across the river, and decided to sit down amid the rural scenery and scare the daylights out of the contented cow standing just to the right. All of this it accomplished to its complete satisfaction, and, judging by his happy expression, to the satisfaction of Edwards as well.

HOW many of you have bumped up and down on the old Jenny landing gear, and wondered how in the world it stood the strain of your ineptitude? (Fine word chucked in to mystify you and boost my stock with the Editor.) The reason that gear stood the awful strain was because it was designed by Paul Gerhard Zimmermann, who supervised the design and building of the first all-metal hull flying boat to be built in this country. Unlike many engineers, he was always ready to fly in the test flights of his own ships—and he's still living, if anyone residing in Mystic, Conn., can be said to live. He's one of the real pioneers—that much-abused word, now appropriated by anyone who flew a Jenny prior to 1926. In Paul's case it really means what it was intended to mean by Webster.

His brother Cy, or Cyrus Johnstone Zimmermann, was raising pineapples in Porto Rico in 1917, when a passing native informed him that the U. S. had decided to do something for the munition manufacturers and the Fisher Body Co., not to mention Colonel Deeds. Cy threw down his hoe, bought a pair of boots and a suit, and emerged fully clothed in New York City. That was the nearest he got to the trenches. The dear old Signal Corps, which handled flying in those days, decided that Cy never could fly, as he hadn't been to College. The Royal Flying Corps, I may add, came to the same decision about me in 1915, and for the same reason—I was weak on Latin verbs and the binomial theorem, or thermometer, or something. However, they changed their minds about me in 1916 and took me in, although I had no more education than a rabbit. Perhaps the fact that the college boys all had crashed by that date may have influenced the R. F. C. in my favor. Or perhaps they had discovered that the dumber you are the better you fly in a war that is being fought for the benefit of others than yourself.

Cy Zimmermann, however, was barred—Paul's Jenny undercarriages were so strong that the American college boys couldn't crash fast enough to do Cy any good. He decided to fly anyhow, and trained with Curtiss. Upon which the dear old Army allowed him to teach the new officers how to fly—they didn't object to his teaching the educated to fly, but not for worlds would they have had a German hear him say "ain't." The same sort of minds believe that a man cannot be an officer and a gentleman if he hasn't been to West Point; and that another cannot possibly be educated unless he has attended an intellectual rolling-mill, where he is stuffed with predigested information and standardized like a sausage, in the pious hope that not a single *original* idea will find room inside his skin—which, as a matter of fact, it seldom does.

Cy taught at Hazelhurst and Call Field until the war ended, became slightly deaf listening to Hall-Scotts, and could now listen to a sermon by the Rev. John Roach Straton or a lecture by Tom Heflin and be quite undamaged by either. That's about the only advantage he derived from the war. Oh yes, I was forgetting—the day the war ended he was given a first lieutenant's commission. The last college boy must have crashed!

On January 16, 1924, with Mechanic Floyd Walton, Cy flew the Aeromarine all-metal hull flying boat, designed by Paul, to San Juan, Porto Rico, making the first flight of a commercial plane between the United States and Porto Rico. He carried passengers at various points on the way down, paying all expenses and arriving March 4, after flying 2,685 miles, exclusive of side trips. He returned in May, taking four days for the trip. In Cuba I met a young Cuban who had a ride with Cy—one Tony, of Matanzas. He asked me if Cy Zimmermann had been made a general yet. I was forced to admit that they hadn't even made him an admiral.

FROM Richmond, Virginia, home of the First Families—and quite a flock of Second, Third, and even Fourth rate ones, as well—comes word of the peculiar effect of air travel on one William Atkins, who, after watching some dare-devil (so the report says!) pilot stunting about, decided that he would take a flight. Up he went—then down he came a few minutes later, absolutely speechless. He had been shocked into silence by a couple of loops. Perhaps this news item accounts for the number of husbands who have been buying flights for their wives lately.

SOMEBODY better slow down Pilot Frank Merrill of the Embry-Riddle Co., Cincinnati. During July he flew 11,682 miles on the Cincinnati-Indianapolis-Chicago route, or 21 round trips and a single trip over the line of 274 miles. It got so monotonous, going back and forth like a metronome, that Merrill used to entertain himself by speculating on the number of new babies along the route each week. The clotheslines displayed the usual bunting announcing the arrival of newcomers—this week a line wouldn't have a single banner; and next week two dozen would be fluttering in the breeze. Imagine a pilot reduced to such extremities! If he keeps it up he'll end like some long-distance pilots, and see squirrels running around the engine and snakes whirling around on the prop. Think how lonesome a man gets flying 11,682 miles! Not good for the head, being too much alone. I knew a big-game hunter who lived alone for two years in Africa, studying the habits of lions. Finally he returned to New York and sat down to write the story of his expedition into the wilds. When he completed it and took it to his publisher, that gentleman was startled to read the title: "Sex Life of the Stone Lions in Front of the New York Public Library." That just goes to show.



Frank Merrill

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Model 555—As above, but with leather cuffs with adjustable tabs as illustrated in Aviator's jacket, instead of knitted cuffs. Each $18.50.

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Model 185—Same as No. 180, but heavy, warm sheepskin lining for winter wear. $5.00

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Model 290—Made of the softest gloveskins, silk lined. Each $6.00

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Model 273—White soft gabardine, unlined. Each $2.00

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Model 276—Navy type, chocolate gloveskin, chamois leather lined. Each $5.50.

Model 274—Navy type as above, but wtih ear puffs. Each $6.50.

Model 275—Army type, tan gloveskin, silk lined, with ear puffs. Each $6.00.

Model 278—Navy type, chocolate leather chamois lined, with warm wool interlining between chamois and outside leather. Each $8.50.

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TECHNICAL

LONE EAGLE BIPLANE

THE Lone Eagle biplane, a two-place light commercial type, was designed and built by Mr. Charles P. Fasig, its motor was designed by Mr. Arthur Chevrolet, and it was test flown by Mr. J. W. Hunt for the Moundsville Airplane Corp., Moundsville, West Va. This ship was named and christened by Jimmy Doolittle in honor of and in the presence of Colonel Lindbergh.

Mr. Hunt put the little ship through some very severe tests before it was entered in the Transcontinental Air Race. From Roosevelt Field, where he started in the class A race, he flew to Columbus, Ohio, the first overnight stop, arriving there in 18th place. The next day when he left Columbus it was raining hard, and inasmuch as the carburetor and intake manifold were not cowled in, ice formed over them and cut 400 revolutions from the engine, making it necessary for him to land. He set the ship down at the Hoosier Airport (Indianapolis, Ind.). Mr. Hunt flew the ship quite a bit while in Indianapolis, demonstrating and carrying passengers. He then flew the ship home after stopping at Dayton and Columbus, Ohio. Before the middle of October, the ship had had over 100 flying hours and had covered about 10,000 miles.

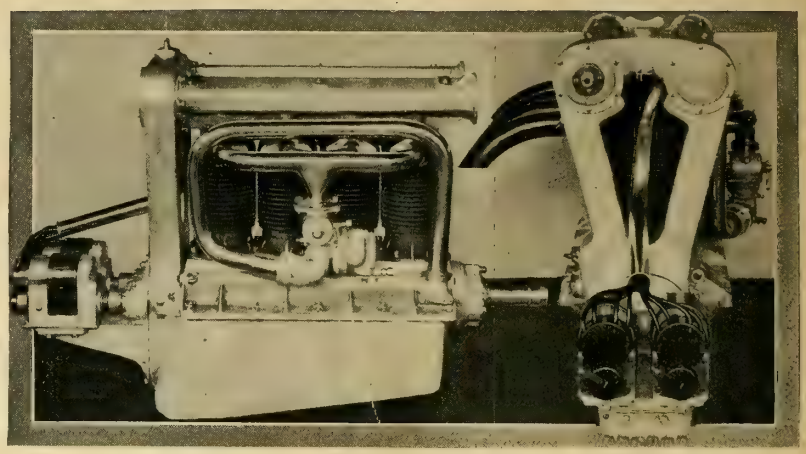
The wings are of conventional design, using solid spruce spars. The Aeromarine 2 wing curve is used. The ribs are built up of spruce and plywood, using the Warren type brace. Compression members are of one-inch steel tubing.

There are two false ribs between regular ribs. The trailing edge is of hard wire, while the leading edge is of spruce.

The wing panels fasten to the fuselage and center section by means of U fittings; this eliminates the practice of piercing the spars at the ends for bolt holes.

The lower panels fit snugly against the fuselage. Both lower panels have a wide sidewalk.

The top panels fit on to a steel tube center section that contains a 20-gallon gasoline tank. This tank is made of terne plate.



The Lone Eagle engine which develops 60 h.p. at 2400 r.p.m.

The fuselage is made of chrome molybdenum steel tubing. There are no wires in the entire fuselage.

Ailerons and the entire tail unit are made of steel tubing.

Control hinges are made of nickel steel.

Control surfaces are worked by cable and pulleys, with pulleys covered by inspection plates.

There are two inspection doors in the fuselage which are operated with "Whizzer" fasteners, one at the tail skid and one at the walking beam.

The landing gear is of the split type, using rubber cord to take up the shock and a piece of soft rubber to take up the rebound. 20-inch by 4-inch tires and wheels are used.

The steerable tail skid is of chrome molybdenum.

The *N* struts, both on the wings and center section, are non-adjustable; this makes the ship easy to rig.

Dual controls can be had with a complete set of dual instruments upon special order.

The standard color is silver.

The engine is a four-cylinder vertical air-cooled type job, designed and manufactured by the makers of the airplane—the Moundsville Airplane Corp. The weight dry is 200 pounds.

The engine develops 60 h.p. at 2,400 r.p.m.

Bore 3⅝ inches; stroke 4 inches; piston displacement 165 cubic inches.

The cylinders are made in one piece of cast iron. Two overhead cam shafts are used. The cams work on a steel cup, and the cup works the valve stem; this relieves side strain on the valve stem.

The crank shaft has five main bearings and a large double row annular thrust bearings to take up the thrust.

The engine is oiled by a high pressure lubricating system. The engine can be had with either a wet or a dry sump base. The wet case holds three gallons of oil.

Two Robert Bosch magnetos are used. The cam shaft, magnetos, and oil pump are driven by a triple strength Diamond chain.

Specifications

Span, upper wing	26 feet 9 inches
Span, lower wing	26 feet 3 inches
Length	20 feet 8 inches
Height	7 feet 8 inches
Cord, both wings	44 inches
Dihedral, lower wing only	2 degrees
Stagger	14½ inches
Incidence, both wings	2 degrees
Gap	48 inches

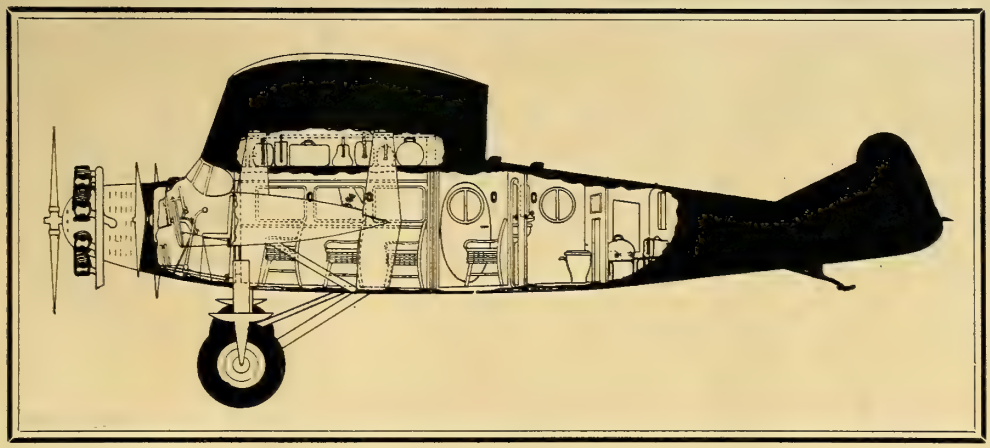
Areas and Weights

Wing area	185 square feet
Stabilizer area	13.5 square feet
Elevator area	11 square feet
Rudder area	6.5 square feet
Fin area	3 square feet
Weight empty	780 pounds
Disposable load	500 pounds
Weight, loaded	1,280 pounds



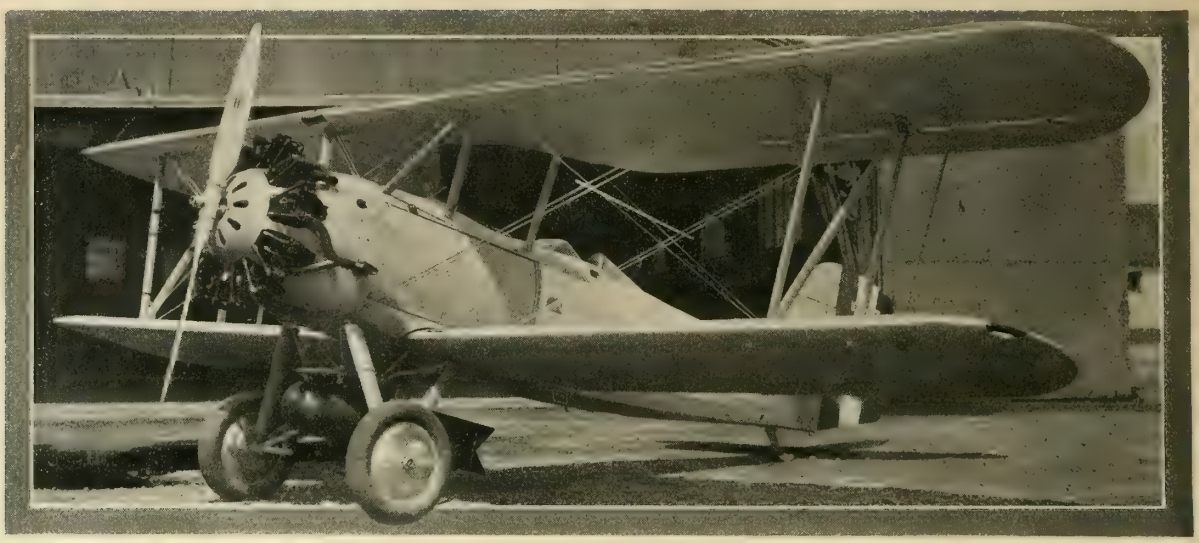
The two-place Lone Eagle biplane of the light commercial type, designed by Charles P. Fasig.

BACH



BACH TEN PLACE TRANSPORT

BACH AIRCRAFT COMPANY
Clover Field Santa Monica
California

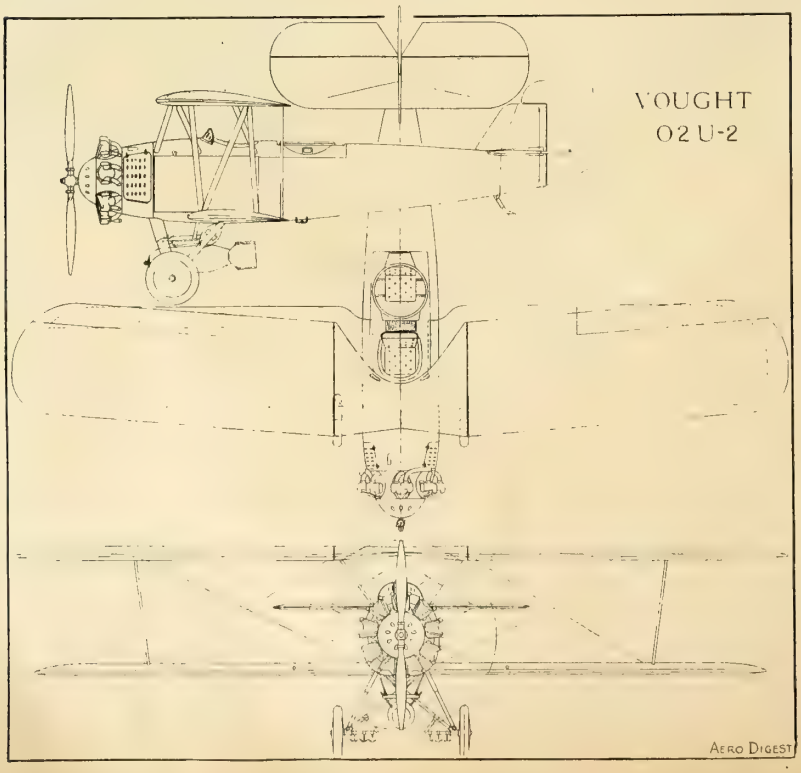


VOUGHT CORSAIR MODEL 02U-2

EARLY in September a new airplane quietly emerged from the experimental department of the Chance Vought plant. This plane is a development of the famous Vought "Corsair" (Model 02U-1). The new model has been developed to meet the latest requirements of the U. S. Navy for a 2-seater general purpose airplane. One of its special characteristics is its quick convertability for various functions by the interchange of standardized landing gears and equipment. Thus the plane is available for a large range of military missions as a high performance amphibian, as a seaplane, or as a landplane.

With but minor plant and jig alterations necessary, and with provision for the special features which are outlined below, the model 02U-2 has already been placed in production so that a large number will be delivered within the next few months.

In the new 02U-2, Vought engineers have been able to meet military demands for a greater load and a greater range capacity, as compared with the 02U-1, without appreciable sacrifice of performance. Provision has been made for carrying a 500-pound bomb on this plane, the mechanism of support and release being adapted for quick removal.



Load factors of 10 endow the plane with extraordinary strength and security for violent maneuvering.

The model 02U-2, like its predecessor, is a single-bay biplane with wings of wooden structure and tubular steel fuselage, all fabric-covered. The plane is of the 2-place type, the pilot's cockpit being forward with the observer-gunner-radio operator in the rear cockpit. Dual control is provided, with the rear stock removable. The rear seat may be folded up to give a clear and unobstructed cockpit for the operation of the movable guns. The seat in the front cockpit is adjustable as to height, as are the pedals for operating the rudder and wheel brakes.

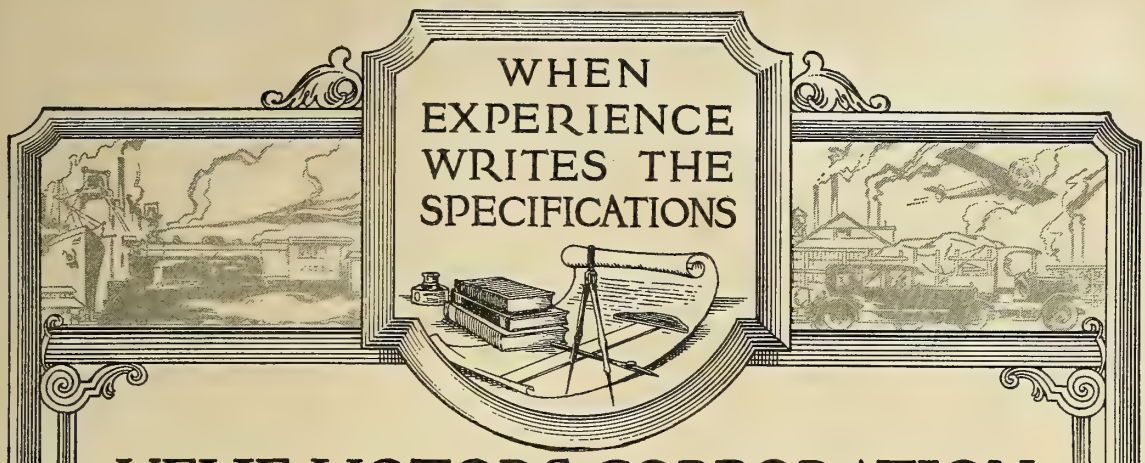
One of the important features of the new model 02U-2 is the extraordinary vision provided for both the pilot and the observer. The new design all-metal center section involves such an arrangement of structural members that a very large cut-out is possible, and the vision of the pilot overhead is obstructed through only a very small angle.

The control surfaces of the model 02U-2 have been somewhat modified in order further to improve the already excellent handling qualities of the "Corsair." Differential ailerons have been installed, and balance has been added to both the rudder and elevators in order to lighten rudder and stick forces.

The new 02U-2 model is designed around the Pratt & Whitney "Wasp" engine. The newest type "Wasp" Series-B engine is used. These engines are equipped with new "hot-spot" heaters for more efficient operation in cold weather.

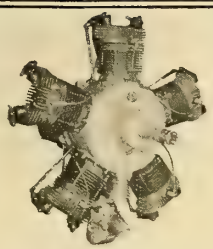
All of the pilot's flying and navigating instruments have been located on one instrument board in the line of the pilot's vision. The compass has been flush-mounted to eliminate projections, and the instruments are lighted for night flying. The cowling over the instrument board behind the windshield has been cut away to improve instrument visibility and increase safety in crashes.

(*Continued on next page*)



VELIE MOTORS CORPORATION

Uses Nickel Steel Vital Parts for Aircraft Engines



Front view of Velie Fixed Radial, 5-Cylinder, 70 H. P. Aircraft Engine used by Mono Aircraft, Inc., Moline, Ill. Cylinders are made of Cast Nickel Steel.

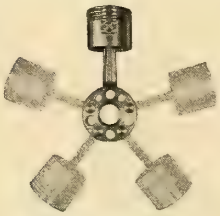
Nickel Steel Vital Parts of Velie Aircraft Engine

Front thrust bearing sleeve
Rear bearing sleeve
Tachometer drive sleeve
Magneto coupling flanges
Valve spring retainer
Rocker shaft bracket
Rocker shaft
Rocker arms
Intake tube flange
Valve lifters
Valve springs
Rocker arm cup
Rocker arm button
Push rod ends
Camshaft
Camshaft drive geat
Camshaft drive gear nut
Cam drive shaft gear
Cam
Cam drive shaft
Crankshaft front half
Crankshaft bearing nuts
Crankshaft rear half
Propeller hub
Propeller flange
Propeller nuts
Counterweight screws
Master connecting rod
Connecting rod links
Wrist and piston pins
Oil return pump gear
By pass valve
Oil pressure pump gears
Oil pump gear shaft
Cylinders—Cast Nickel Steel
All bolts, nuts, studs—Nickel Steel

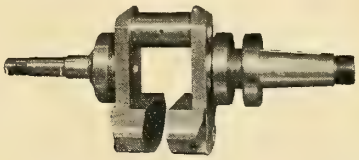
THE Velie Aircraft Engine is installed in a two-place Monocoupe, a lighter type of airplane designed to take off in from three to five seconds and maintain a speed of 100 miles per hour, with a cruising radius of 400 miles. The dependable performance of this compact little power plant makes possible the remarkable maneuverability of this ship —an advantage which can be traced back to the dependability of the Nickel Steel parts.

All vital parts of Velie Aircraft Engines are made of Nickel Alloy Steel. The uniformly high physical properties of Nickel Alloy Steel insure dependable performance in parts that must be pared to the minimum to save weight.

The performance records of the Nickel Alloy Steel parts used by leading manufacturers are conclusive evidence of the dependability of these Alloys. The experience of typical users has contributed to an extensive fund of valuable technical information. You are invited to consult our engineers and thus draw upon these helpful data.



One piece Nickel Steel master connecting rod and four link rods assembled with piston.



Two piece counterbalanced Nickel Steel crankshaft.

FOR STRENGTH WHERE THE STRESS COMES — NICKEL STEEL

Nickel
FOR ALLOY STEEL

Send for "Buyers' Guide to Nickel Alloy Steel Products"

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY (INC.), 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL

(*Continued from preceding page*)

A device which is a combination engine starter and booster magneto control has been included in the model 02U-2. This device is convenient in starting of the engine from the cockpit. Several other novel mechanisms have been developed for the operation and control of the various items of military equipment. The fixed guns are mounted in the upper center section and fire outside the propeller disc, eliminating the necessity for any synchronizing gear.

The engine nose cowling, which is adjustable for the control of the air blast on the crankcase and cylinder barrels of the air-cooled engine, is now controllable from the front cockpit, making it possible for the pilot, while in the air, to make adjustment of this air-flow in order to help maintain his engine temperature at the proper point under various operating conditions.

The plane is extremely clean throughout, all flying and landing wires having their terminals submerged in the wings. Additional accessibility also has been provided throughout the entire plane.

One of the most important improvements of the model 02U-2 over the "Corsair" is its increased range, this new model having a fuel capacity of 120 gallons. This capacity is unusual for a high performance plane of this type and makes it valuable for long range work or for long distance cross-country travel.

The wheel type landing gear is of the type similar to that used on the "Corsair" and includes the oleo spring shock-absorber unit in the front leg and a special Bendix wheel brake installation. Stub axles have been provided instead of the jury axle so that the model 02U-2 may land and take off from airplane carriers while carrying the large 500-pound bomb. The standard Vought all-metal float type gear can be fitted to this plane, this water gear being interchangeable with the other standardized gears.

The most important feature of the 02U-2 model is its adaptability as a high-performance amphibian. The amphibian gear which was tested experimentally last Spring will be used in this new model. The amphibian gear is simple and light; it is interchangeable with the other type of landing gear supplied, giving the U. S. Navy Department a high performance amphibian plane which can land on the decks of the aircraft carriers and be used in fleet operations from carriers, cruisers, and battleships.

KEYSTONE "SIGN CARRIER"

THE "Sign Carrier I", which was specially constructed by the Keystone Aircraft Corporation, Bristol, Pa., is said to be the largest commercial biplane in use in this country, being of the L.B.-6 bomber type design, which the company is furnishing for the U. S. Army Air Service.

It has a wing span of 90 feet, with an area allowing room for 18 six-foot letters arranged horizontally close to the wing. A special arrangement of superimposing one series of words over the other allows the intermittent changing of the sign's reading. In this manner it is possible for the plane to carry two combinations of words, one over the other, containing a possible total of 36 letters.

The electric power for the sign is generated by a battery of dynamos capable of producing 7,000 volts, enough current to light a small town. Although the plane is capable of carrying 12 passengers if fitted for transport service, most of the space in the large cabin is occupied by the electrical apparatus.

Thousands of feet of wiring, necessary for the sign, are carried in conduits built inside the wing, and the transformers also are carried on the wing in specially constructed fireproof compartments.

Since neither the pilot nor the electrician, when seated in the plane, can see the letters on the lower side of the wing beneath him, a special tell-tale tube light, connected with each letter, is placed along the trailing edge of the wing to indicate that the sign is illuminated. A periscope showing the bottom side of the wing enables the passengers of the plane to see that the entire sign is functioning properly.

The power plant of the "Sign Carrier I" consists of two Wright Whirlwind motors of 225 h.p. each and one Pratt and Whitney motor of 425 h.p. It has a fuel capacity which enables it to make a sustained flight of seven or eight hours, or from early evening to midnight.

Following are some of the dimensions and specifications of the Sign Carrier:

Specifications

Overall length .....44 feet 4 inches
Span, upper wing.....75 feet
Span, lower wing .....90 feet
Chord, upper wing .....8 feet
Chord, lower wing .....8 feet
Area, upper wing .....586 square feet
Area, lower wing .....674 square feet
Total wing area .....1,260 square feet
Angle of incidence, lower wing ..5 degrees
Angle of incidence, upper wing ....5 degrees
Gap, maximum .....110 inches
Gap, minimum .....97.8 inches
Dihedral, upper wing .....2 degrees
Dihedral, lower wing .....2 degrees
Wheel tread .....15 feet 3 inches
Wing loading ....8.1 pounds per square foot
Power loading .....11.6 pounds per h. p.
Horsepower (3 engines) total
875 h. p. 1,800 r. p. m.
Fuel capacity .....300 gallons
Oil capacity .....30 gallons

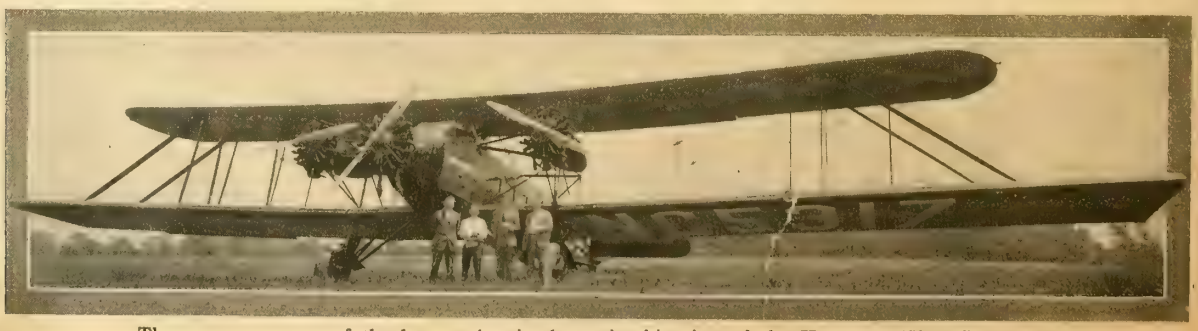
Performances

Full speed at sea level ....85 to 105 m. p. h.
Stalling speed .....46 m. p. h.
Initial rate of climb ....750 feet per minute
Range .....500 miles

The "Sign Carrier I", with a large electric signboard on its lower wing, was given its first trial flight on the night of September 13 over New York City. The plane cruised for more than a half-hour over the midtown district of the city, bearing letters illuminated by tubes of Claude Neon gas, which has the peculiar faculty of giving a brightly colored light when subjected to high alternating current voltage. These letters flashed alternately the name and address of the company pioneering this new method of advertising.

A large group of business men, guests of the company sponsoring the test, viewed the trial flight from the roof of the Hotel Astor. As it passed back and forth over the city, its message, "Aerial Advertising" and "353 Fifth Avenue", flashing intermittently, was read from the street as easily as if the plane were only 500 feet above the ground instead of the 2,000-foot altitude at which the test actually was made. During the flight, the advertisement was visible over an area extending from about 14th to 125th Street and from river to river.

The project is the result of a number of years of study by Roland Rohlfs, company pilot. C. G. Peterson, president of the firm, stated that the corporation plans to acquire additional planes of like construction to be used exclusively for this form of advertising. The cost of the advertising will be based on the square miles of territory covered.



The enormous span of the lower wing is shown in this view of the Keystone "Sign Carrier I"

THE KEYSTONE AIRCRAFT CORPORATION

Established 1920

and

THE LOENING AERONAUTICAL ENGINEERING CORPORATION

Established 1917

announce the merger of the two companies.

Both the Loening plant, 31st Street and East River, New York City, and the Keystone plant at Bristol, Pennsylvania, will continue to operate as at present—thus preserving to the merged company the benefits of the skill and experience acquired by the two established organizations.

In addition to the well known military types, a complete line of Commercial Cabin Amphibians and Trimotored Overland Transports will be produced by the corporation.

KEYSTONE

KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA

CRAWFORD Metal Plane

TESTS were recently completed for an all-metal monoplane designed by Harvey Crawford. Production of planes of this type will begin shortly in a plant to be located in or near Los Angeles.

This plane is a two-seater design, with the passenger cockpit situated under the wing.

The fuselage is of monocoque construction and covered with corrugated sheeting. Bulkheads are built up of dural U channels and the skin is riveted thereto. Four 14 gauge angles prevent tearing of the sheeting at the corners.

Landing gear is of the split axle type. A spring leaf type tail skid is employed.

Tail surfaces are balanced. Elevators are actuated by push and pull rods, and the rudder is operated by the customary cables.

The wing is constructed in three sections. Dural tubes (used in place of spars) are inserted in the bulkheads which are located one in each end of the wing sections. False ribs are inserted at two-foot intervals along the leading edge. The chord, which at the center section is 6 feet 6 inches, tapers down to 3 feet 3 inches at the tips of the wing. Dihedral varies from 2 degrees at the center section to zero at the tips.

Besides two 15-gallon gasoline tanks located in the wing, there is another of 22-gallon capacity situated just in front of the passenger cockpit. An 8-gallon oil tank is installed aft of the engine.

Power is furnished by a 165 horsepower Gnome rotary engine.

Exceptional lateral and longitudinal balance is claimed for this plane. If stalled the plane will not slip off on one side nor will it go into a spin. By releasing the controls, the plane will come out of any unnatural attitude into which it may have been put.



Front view of the Crawford metal monoplane showing wide wheel tread

Specifications

Length overall	24 feet 9 inches
Height overall	8 feet 4 inches
Span	34 feet
Chord (maximum)	6 feet 6 inches
Chord (minimum)	3 feet 3 inches
Wing area	214 square feet
Weight empty	1,100 pounds
Pay load	1,000 pounds
Disposable load	800 pounds
Gross weight loaded	2,900 pounds
Wing loading	13.7 lbs. per square foot
Power loading	17.6 lbs. per horsepower
High speed	148 miles per hour
Cruising speed	130 miles per hour
Landing speed	30 miles per hour
Run required to take off	100 feet
Run required in landing (no brakes)	300 feet
Rate of climb at sea level	1,000 feet per minute
Service ceiling	20,000 feet
Gasoline capacity	52 gallons

FAIRCHILD CABIN PLANE FOR BYRD ANTARCTIC EXPEDITION

THE Fairchild cabin plane fitted for Commander Byrd's Antarctic Expedition is considered an FC-2W2 type although it has been changed in many ways. The most important change was the raising of station 3 six inches to take compression of new ski gear leg. The new skis now have a spread of 10 feet instead of seven and a half.

The tail has a new balanced elevator with a control system which raises the front end of the stabilizer by means of diagonal struts. The area of the rudder has been increased with a larger balanced portion.

An air heater was installed to heat air entering the breather pipe and keep the carburetor warm, thus preventing any water which may collect in the carburetor from freezing.

Many facilities have been worked out for taking pictures. A fourteen-inch hole in the floor of the cabin was made so that a camera might be put through it. The rear doors have oval holes through which oblique cameras can be projected. These holes are covered with black silk when not in use.

The baggage compartment was adapted for radio installation. It has been completely upholstered with Dry Zero kapok. Two small round windows were provided, one on each side. Rather than have a fixed seat, members of the Byrd party decided to have a small bucket seat which may be screwed down to the floor at any location suitable to meet all eventual needs.

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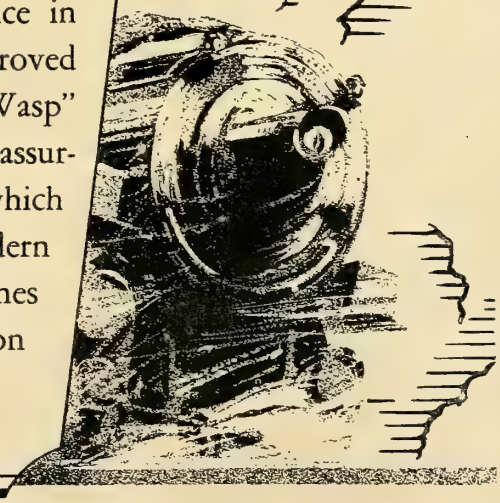
Commander Byrd's Pratt & Whitney-engined Fairchild cabin monoplane "Stars and Stripes"

When the World's Crack Trains are too Slow!



"Wasp" engines in Ford planes will be used in the Coast-to-Coast Rail-Airline of the Pennsylvania Railroad-Transcontinental Air Transport.

Millions of miles of faithful service in military and commercial ships have proved the thoroughbred qualities of "Wasp" engines. Passengers will have the assurance that the power plants behind which they ride embody the finest in modern design and workmanship—engines with and international reputation for leadership.



PRATT & WHITNEY U.S.A. DEPENDABLE ENGINES

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

(*Continued from preceding page*)

A sliding window, situated right over the cabin, was installed for taking sextant readings.

As a safety factor, a Pyrene extinguisher which works by pressure was installed. In case of fire a handle is pushed down, and the Pyrene is so placed that it sprays the engine.

The radio set installed will have a radius of 2,000 miles. Three antennas are to be tried out. The standard one is let down through the floor and left hanging, and when not in use pulled in again. Another type to be used attaches under the tip end of each wing. At the loose end of the antenna will be a wind cone, which will trail along with the plane. The third attaches to the wing tip and extends back to the tail. The latter two are merely experimental and have never been used before.

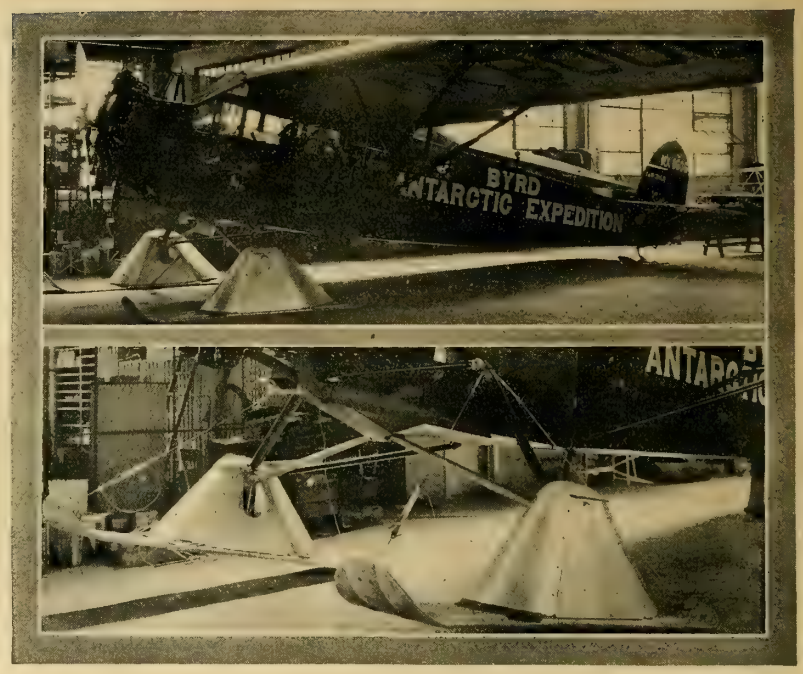
One of the most interesting and vital special jobs done on the Byrd plane was the designing of the ski landing gear. The skis were made of birch, 109 inches long and 22 inches wide, upon which were mounted specially designed pedestals incorporating rubber shock absorber units, which were designed to give a maximum vertical deflection of the ski of 8 inches. The amount of rubber is sufficient to absorb the energy of a free drop of 18 inches of the plane when loaded to a gross weight of 5,500 pounds. The whole is enclosed in sheet dural fairing.

The axle is guided by a pair of crossheads running in vertical guides, which keep the ski always in alignment with the longitudinal tubing, and is supported by a drag strut similar to that now used. The fuselage is supported by a bronze casting on the axle through a set of streamline steel tubes, which consist of a tripod bolted to the side of the fuselage, with legs attached to the lower longeron at station 3 and 20 inches above the lower longeron at station 3. Two of the legs of the tripod are braced fore and aft by a third leg attached to the fuselage at the lower longeron station 2.

At the apex of the tripod, a streamline strut extends to the casting on the axle. Special struts are all that are needed to replace the wheels by the skis. They give the skis a tread of 10 feet instead of 7 feet 7 inches as for the wheels.

The tail ski is so designed as to be attached directly to the standard swivel tail skid unit after the shoe and wheel are removed. The ski is a laminated wood structure, 31 inches by 14 inches, with a short steel runner internally located on the bottom. The bracket which attaches the ski to the tail skid post consists of two uprights, spaced 4 inches apart and fastened to the ski by means of four bolts each. Steel tubing fits between these uprights and is fastened to the tail skid post by the same three bolts holding the shoe and wheel. Two bronze bushings, with a bearing length of one-half inch each, fit in the end of the steel bearing tube and are held against the ski uprights by means of a spacer tube. A $\frac{5}{16}$-inch bolt runs through uprights, bushings and spacer locking the whole position. The ski thus has a combined movement about a vertical and a transverse horizontal axis. Shock cords and check wires run from the forward and rear ends of the ski to the fuselage and skid post, thus keeping the ski in line when in flight and tending toward this position under all loads.

When the plane was flight tested last month, Mr. Webster found everything working perfectly. The tail was very rigid, thus proving the success of the new tail tracer.



Views of Commander Byrd's Fairchild plane showing the arrangement of skis

BABCOCK MONOPLANE

By W. E. Burton

EXTENSIVE tests are now being given a new monoplane designed by V. C. Babcock of Akron, Ohio. The new ship, which has been given the model number, LC-11, is intended to be placed on the market as a light, inexpensive plane for personal use. The three-cylinder radial engine, developing 55 horsepower drives the ship at about 100 miles per hour with a fuel consumption of only 3½ gallons an hour. The engine was built by W. G. Clark.

Wood frame construction is used throughout the ship. The fuselage is of unconventional appearance, largely because of the presence of a single wide seat between the wings. This seat provides for side-by-side seating of the pilot and passenger. Windows are provided in both the wing surfaces so that the ground below is visible. The rear portion of the fuselage tapers sharply to a narrow, triangular cross section. Plywood is used as a covering. Wings are covered with the usual cloth. Dual controls are installed so that the plane can be used for instruction.

Instead of the stick type tail skid, there is a small rubber-tired wheel mounted in the rudder so that it turns with the rudder, making steering on the ground easy. Front wheels are equipped with brakes.

The new monoplane has an overall length of 19 feet and a wing spread of 30 feet. The wing area is 130 square feet. A useful load of 500 pounds can be carried. The landing speed is 30 miles per hour.

Although only preliminary testing of the new craft has taken place, first flights proved that it has a quick take-off, handles easily, and is very stable in flight. It is planned to form a company for manufacture on an extensive scale.



The Babcock monoplane Model LC-11 powered with a Clark 55 h.p. engine



ALL WINNING SHIPS *in National Air Races were finished with* BERRYLOID

Every winning ship in the National Air Races, and with only one or two exceptions every ship that finished in the money, was a Berryloid job. Clearly, Berry Brothers' Progressive Aircraft Finishes are the choice of America's airplane manufacturers. Developed to meet the exacting demands of air service, Berryloid is an elastic, durable finish that won't rub off and is not affected by gasoline or extremes of temperature. Get the utmost in beauty and protection for your planes—write for, "Specifications for Aircraft Finishing", an authoritative book in its third edition.

PROGRESSIVE AIRCRAFT FINISHES

Progressive Aircraft Finishes carried in stock for immediate shipment by

CENTRAL WALL PAPER & PAINT CO., INDIANAPOLIS, INDIANA
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BERRY BROTHERS
Varnishes Enamels and Lacquers
Detroit, Michigan 1858—*70th Anniversary*—1928 *Walkerville, Ont.*

Manufacturer of Progressive Aircraft Finishes

PARAGON MONOID PROPELLER

A NEW airplane propeller, made of moulded veneer is being placed on the market by the Paragon Engineers of Baltimore after three years of experimenting and from the results obtained, this propeller bids fair to increase airplane efficiency greatly. The Monoid as it is called, was designed by Spencer Heath, president of the Paragon Engineers, Inc., and is constructed from a large number of very thin layers of wood, principally birch, machine formed and tapered in such a manner that when the entire number are assembled and impregnated with water-proof cement, under pressure in a specially prepared mould, the resulting product is a completely formed propeller substantially without external carving of any kind. The tapered layers of wood are so laid that the direction of their fibers alternates at a considerable angle between adjacent layers, thus giving a cement impregnated, interlaced fibre construction. After the core is shaped, as to outline, pitch, etc., this cross veneering is then glued on under pressure and a complete "skin" over this. This gives a propeller which besides holding its shape under all conditions, is almost indestructible in the ordinary sense of that term. While accomplishing these results, the weight, including high nickel alloy metal sheathing on the leading edge, is from 15 per cent to 30 per cent less than propellers of ordinary lumber construction.

To accomplish these results special machinery for tapering the thin laminations was designed and built in the shop of the Paragon Engineers, Inc., as well as special moulds and other appurtenances for shaping the propellers. Several processes for treating wood so as to increase the adhesive qualities of the glue have also been perfected and are being used in construction of the new type Monoid propeller.

These propellers were tried under actual flight tests in the latter part of 1926. Since that time they have had rather wide distribution. In fact, the Paragon Engineers, Inc., report that they are in quantity production especially on OX, Liberties, Whirlwinds and Caminez. Orders for other types of engines are also being filled but necessitate longer time.

Kreider-Reisner Aircraft Co., manufacturers of the well known Challenger, are using these propellers as standard equipment and test propellers are being made for several other concerns contemplating using them as standard equipment. The success of the Monoid has been such that the Paragon Engineers, Inc., have practically discontinued manufacturing the lumber type propeller with the exception of special orders.

MAHONEY-RYAN MONOPLANE

A NEW type monoplane designed for the Mahoney Ryan Aircraft Corporation by W. L. Schultz and Donald A. Hall, experimental engineers, has been announced at San Diego. The basic ideas were Hall's, and Schultz has been largely instrumental in adapting them. The engineers have been working on plans for the plane since last November. It has been completed and put through tests for the past month in and around the region of San Diego.

The plane carries places for two people. It has a wing span of 27 feet and is 22 feet long. The wing has a five-degree dihedral. In landing position, the wing is set at a 22-degree angle with reference to the ground; therefore no brakes are necessary. It stops within 150 feet. It is intended primarily for training purposes.

In one test the ship was accidentally stalled at about 200 feet above the ground, while coming out of a fog bank. J. J. Harrigan, Mahoney test pilot, was flying the plane. The plane, uncontrolled, righted itself almost instantly and continued on in the normal flying attitude.

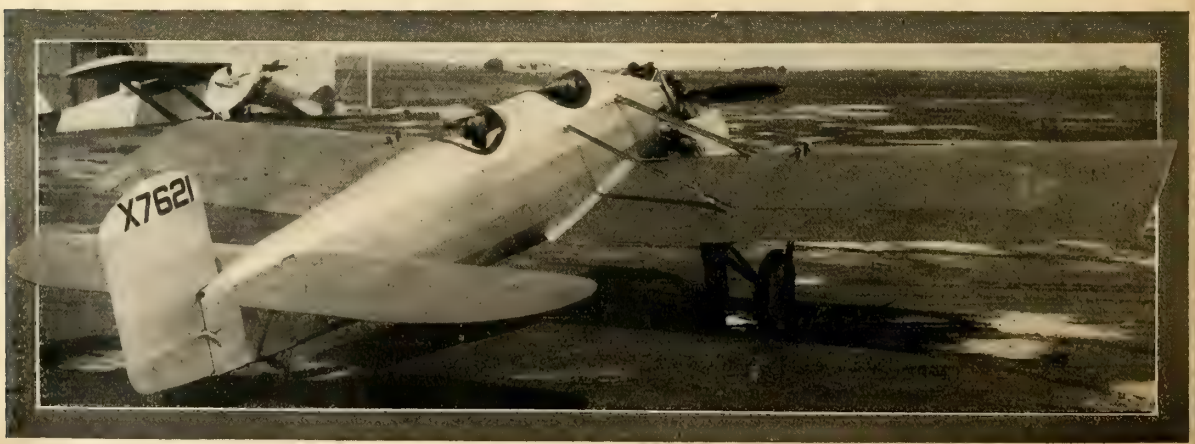


The new Mahoney-Ryan in flight

The first departure from accepted aviation standards, which has been the subject recently of much experiment by aviation engineers, is the low single wing. Another unique feature about the plane (and one which is becoming more and more accepted among aviation experts as a decided safety factor) is the wide tread of landing gear. In this monoplane the tread is unusually wide, being at least as large as that of the *Spirit of St. Louis*. A comparison between the size of the two planes reveals how much smaller the new ship is.

The most radical change incorporated in the design of the new monoplane is the absence of a stabilizer, heretofore considered an absolute necessity. Manipulation is secured through the use of a movable surface which acts as an elevator. No fin is used, but a large balanced rudder completes the easy handling features and makes the plane delicately responsive to touch.

Development of safety features is said to be the prime motive in the new monoplane. This new monoplane has a much shorter wing spread than that of the usual monoplane with the same carrying capacity. This is a distinct advantage toward size reduction, which is one of the aims of engineers.



The Mahoney-Ryan low wing commercial monoplane has no fixed stabilizer or fin

A SISTERSHIP TO THE "SPIRIT OF ST. LOUIS"



PERFORMS BETTER AT ANY ALTITUDE

Than Any Other Whirlwind Cabin Plane in America!

DISTRIBUTORS

Aircraft & Airways of America . *Pittsburg, Pa.*
Massachusetts Airways Corp. *Springfield, Mass.*
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AT ELY, Salt Lake City, Denver, Colorado Springs, Mexico City ... thousands of feet above sea level, the *Ryan Brougham* is the one Whirlwind cabin plane that does its work with full load. At *any* altitude, the *Ryan Brougham* takes off faster and lands slower with full load than any other Whirlwind powered commercial cabin plane. ¶ Thus, the requirements of cabin plane owners, who are fast realizing the absolute necessity of being able to operate in and out of small fields, climb quickly over storms, cross high mountains easily ... with room to spare, are more than met by the *Ryan Brougham* which, by performance and numbers sold, has led the Whirlwind cabin plane market since the building of the "Spirit of St. Louis." ¶ Appointments include full spring cushion passenger seats of Chase mohair, luminous instrument board, wheel tail skid, hookless fastener inspection triangles, and full width sedan type doors. There's *nothing more to buy*. Price, $12,200 at Factory.

DISTRIBUTORS

Beacon Airways of America, Inc. . *Kansas City, Mo.*
Interstate Transit Lines *Omaha, Nebraska*
Rapid Air-Lines, Inc. *Rapid City, So. Dakota*
Scenic Airways, Inc. *Phoenix & Grand Canyon, Ariz.*
Mission Airplane Services *San Antonio, Texas*
Thompson Flying Service *Salt Lake City, Utah*
Mutual Aircraft Corp'n *Los Angeles, Calif.*
Rankin Flying Service *Portland, Oregon*
M. A. Zuniga *Central America*
Count G. Bonmartini *Rome, Italy*

The valuable Mahoney-Ryan franchise is available only to operators and qualified business executives.

The Ryan Brougham is Approved Type No. 25

THE MAHONEY-RYAN AIRCRAFT CORP'N

Anglum, (St. Louis County) Missouri

AM-12

PAMPHLETS DEAL WITH SOARING FLIGHT

SOARING flight remains one of the mysteries of aviation. Several theories advanced at present to explain it, although correct theoretically, leave unexplained many soaring-flight phenomena concerning which independent observers agree.

Recently a new and promising theory has been developed. In an effort to render these new thoughts on soaring flight available to all who may be interested, the Soaring Flight Company of Clarendon, Va., has compiled three pamphlets dealing with the subject.

The first of these papers discusses the principles of the soaring flight of birds. According to the theory expounded therein, energy for soaring depends upon the relation of the bird's flying speed to the direction of the wind, and flight involves an orbital or segmented flight path. Several facts of bird flight, otherwise inexplicable, can be correlated under this theory. Among these are the observations that soaring flight is a wind phenomenon, that it is associated with a circling or zigzag flight path, and that it may take place in a descending air current.

The second paper, entitled "Wind-Driven Flight", analyzes the motions of a sailplane in respect to the mass of the air and the mass of the earth, and attempts to show how certain combinations of motions transfer energy with reference to the earth from the wind to the machine in flight.

The last paper is a review of the various observations of naturalists and aerodynamists on the soaring flight of birds.

These pamphlets are for sale by the Soaring Flight Company.

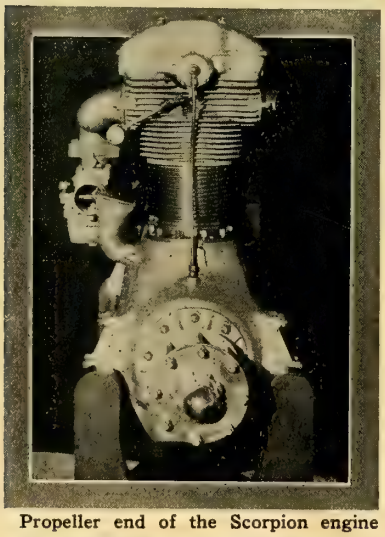
NEW CARBIDE LIGHT

THE Alexander Milburn Company of Baltimore announces a new kind of carbide light which will operate with either lump carbide or carbic cakes. This addition to the Milburn line is to provide a light or welding generator with extra gas storage space and does not restrict the user to any particular kind of carbide.

THE AIR-COOLED SCORPION ENGINE

THE Aeronautical Products Corporation of Naugatuck, Connecticut, have started production on a new completely enclosed four cylinder-in-line, air-cooled engine, the "Scorpion".

The Scorpion, incorporating in one design many of the qualities of both water-cooled and air-cooled engines, opens for itself a large field in the light plane class. It may be installed on any tubular or flat engine bed and will replace Curtiss OX, Hispano and Curtiss C and K6 mountings with but little change in the arrangement of controls, position of gas and oil tanks, style of streamlining, etc.



Propeller end of the Scorpion engine

One of the first things to attract the observer's attention is its remarkable compactness; its overall dimensions are only 45⅝ inches long, 23 inches high and 19 11-16 inches wide. Its weight empty, with dual magnetos and Zenith carburetor, is 293 pounds.

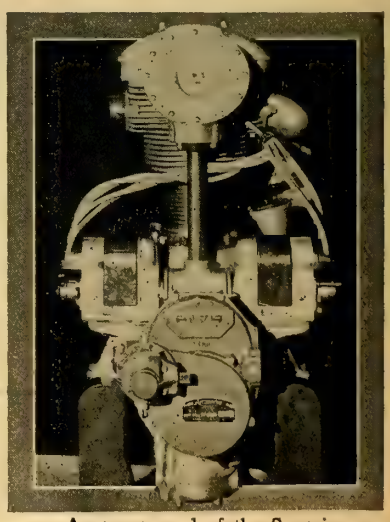
The units are so accessible that parts may be dissembled with great facility. No attempt has been made to reduce the weight beyond safe limits. The designers have felt that the ideal power plant in this class is one requiring little attention and only ordinary care. On this account sturdy, foolproof parts are employed throughout, requiring little or no inspection before and after every flight.

Having a bore of 4⅝ inches and a stroke of 5 inches, the Scorpion delivers 100 horsepower at 1,800 revolutions per minute.

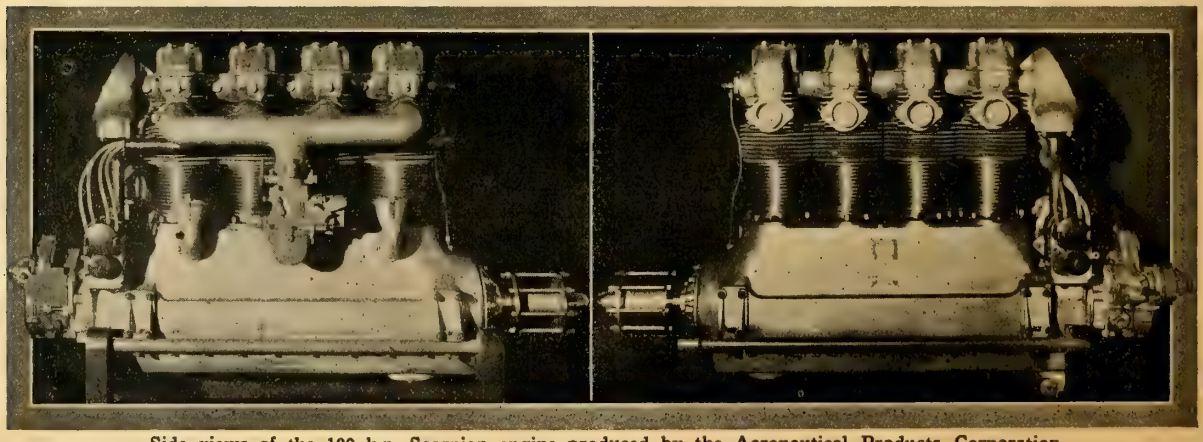
Overhead valves, in which the entire valve action is oil-tight, with oil circulating through, is made possible through the new cantilever springs—an exclusive patent belonging to the company. The valves are made of silichrome and the valve seats are aluminum bronze. Oil feed is the full pressure type. The overhead camshaft is operated by means of a vertical drive shaft and bevel gears, eliminating the usual rocker arm push rods.

Other noteworthy features of the Scorpion are steel forged cylinder barrels, salt filled exhaust tulip valves and alloy cylinder heads. The magnetos are the new Robert Bosch design.

In the present model an Aeromarine Inertia Starter is installed, but provision is made for using any standard make of starter.



Accessory end of the Scorpion



Side views of the 100 h.p. Scorpion engine produced by the Aeronautical Products Corporation

SCORPION

100 H.P.

$1825.00

F. O. B.



REGISTERED TRADEMARK

AERONAUTICAL PRODUCTS

CORPORATION

MANUFACTURERS

NAUGATUCK, CONN., U.S.A.



THE BIRD BIPLANE

THE Brunner Winkle Aircraft Corporation has a factory with 25,000 square feet of floor space in Glendale, Brooklyn. N. Y. Their production plane is an open cockpit, three-place biplane, although it may be called a sesquiplane as the upper wing has a much larger span than that of the lower wing.

The minimum safety factor employed throughout the design is 8 plus.

By careful stress analysis and design the fuselage weight has been kept down to seventy pounds by the use of seamless chrome molybdenum steel tubing, welded in the form of a modified Warren truss with no wire bracing. The engine mount is demountable for substituting various types of engines.

The stick and rudder cable in the front cockpit are quickly removable when dual control is not desired.

View from either cockpit is exceptionally good. From both cockpits one can easily see the wheels and ground when landing because of the narrow chord of the lower wing and the great stagger.

The landing gear is similar to that used on high grade military designs. The shock absorbers are a combination of oleo and rubber members eliminating landing shocks and providing silent, smooth, taxiing.

A forty-five gallon fuel tank is located at the rear of the engine compartment, behind the firewall. A five-gallon reserve system for emergencies is incorporated in the main tank.

Behind the rear cockpit in the aluminum turtledeck is a compartment for luggage. The fuselage at the stern post is equipped with a large inspection door operated by "Whizzit" fasteners.

The tail skid is of the spring type made of silicon steel mounted on a swivel. It requires very little attention and has a long life due to steel shoes being used.

The wings are of constant chord, to a point approximately six feet from the tip, where there is a gradual rounding, giving the entire wing a tapered appearance and cutting down the resistance, also increasing the efficiency of the ailerons which have a tapered chord. In test the wing ribs show a factor of safety of 13, double that required by the Department of Commerce. The ailerons are connected by push-pull rods to bell cranks contained in the upper wing and by vertical members between the stick and the center section, eliminating outer control struts.

The tail surfaces are of welded tube construction covered with fabric. The elevator is controlled by push rods, while the rudder is actuated by cables.

The radiator, which is of the tunnel type, is built as an integral part of the engine mount and contained inside the cowling. This fairing cuts down the head resistance appreciably.

The interiors of the front and rear cockpits are upholstered with a durable leatherette and equipped with a paneled crystalline instrument board with its necessary group of instruments. Deep cushioned, form fitting seats are provided. All models are wired for lights and have tubing installed for air speed indicator.

The exterior is covered with Flightex and finished in a two-tone effect with Berryloid.

The "Bird" has the following tested performance, powered with a 90 h.p. Curtiss OX-5 engine although 80 and 120 h.p. air-cooled engines will be standard equipment.

Performances

High speed	120 miles per hour
Cruising speed	100 miles per hour
Landing speed	35 miles per hour
Take off run	100 feet
Climb at sea level	1,000 feet per minute
Absolute ceiling	20,000 feet
Gasoline consumption at 100 m.p.h.	5 gallons per hour
Endurance at cruising speed	9 hours

Specifications

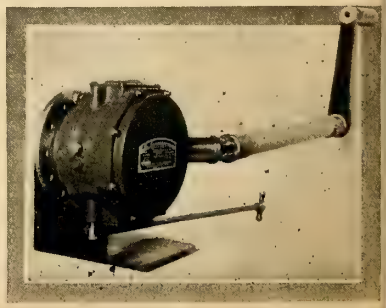
Length overall	22 feet 3 inches
Height overall	8 feet
Span upper wing	34 feet
Span lower wing	25 feet
Chord upper wing	69 inches
Chord lower wing	48 inches
Total wing area	266 square feet
Airfoil	U. S. A. 40-B modified
Stagger	30 degrees
Tread of landing gear	5 feet 6 inches
Weight empty	1,175 pounds
Disposable load	800 pounds
Gross weight	1,975 pounds

AEROMARINE INERTIA AIRCRAFT STARTERS

THE Aeromarine Company produced the Aeromarine type "A" Inertia Starter and since 1923 over one thousand of this type alone have gone into service on Government aircraft. The latest development is the Type "C" small concentric starter which has been designed to meet the demand for the smaller engines in commercial and privately owned aircraft. Extreme compactness, very light weight, ease of cranking and universality of application are notable characteristics of this new commercial machine. Installation difficulties are overcome by the large angular capacity universal joint in the hand crankshaft, which permits the hand crank to be led off laterally and longitudinally and in all intermediate positions whereby the one machine covers the entire range of installation requirements.

The same high standards of workmanship and efficiency which characterize the well-known military types are maintained in this new and moderately priced starter for which an extensive production schedule is going through.

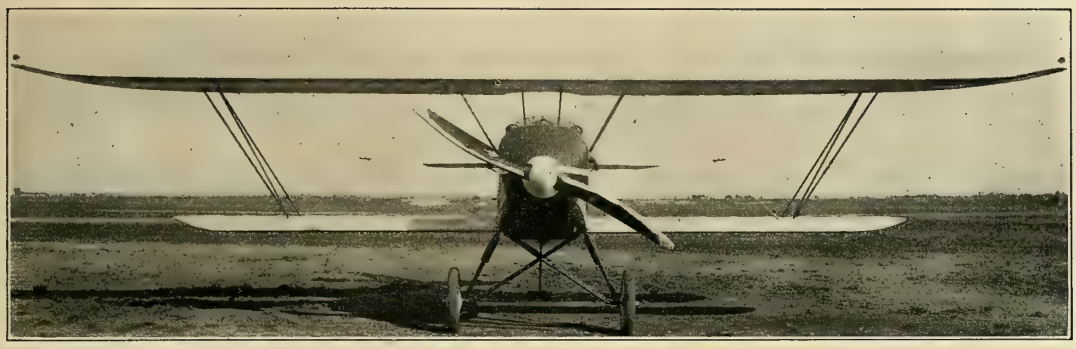
The special hand crankshaft joint arrangement permits of cranking either from the side of the fuselage, or by the more modern disposition with the hand crank in the cockpit, which gives strictly one man starting. Either disposition is afforded without any change in the standard machine.



Aeromarine type C inertia starter

THE "BIRD" 3-PLACE BIPLANE

combines unexcelled performance with safety



Front view of "Bird" Biplane with Curtiss OX-5 90 H.P. Engine

Official tests by the Brunner Winkle Corp. prove conclusively that "BIRD" planes give higher performance than any other OX5 equipped type.

CONSTRUCTION FEATURES:

Chrome Molybdenum construction throughout. Minimum factor, 8 plus.

Quick detachable stick and rudder in front cockpit.

Excellent vision.

Wheels visible from pilot's cockpit.

Baggage compartment.

Panel instrument board.

Tunnel type radiator.

Adjustable stabilizer.

All ships wired for lights and airspeed.

5 gal. reserve tank.

PERFORMANCE DATA:

High speed	120 m.p.h.
Cruising speed	100 m.p.h.
Landing speed	35 m.p.h.
Take off run	100 ft.
Climb at sea level	1,000 f.p.m.
Absolute ceiling	20,000 ft.
Gasoline consumption at 100 m.p.h.,	5 gal. p.h.
Endurance at cruising speed	9 hr.

Dealer franchises for this superior plane are still available in some territories

BIRD

BRUNNER-WINKLE AIRCRAFT CORP.

7240 Charlotte Place

Brooklyn, N. Y.

HEATH "BABY BULLET" LIGHT RACER

THE Heath "Baby Bullet" which won the 300 cubic inch race event at the National Air Races, Los Angeles, California, on September 14th was flown by Mr. E. B. Heath who for three consecutive years has carried away the titles for light planes at the National Air Races.

During the race the plane was equipped with a 4'4" diameter 3'6" pitch propeller turning 2,800 r.p.m. on the ground. On the steep climb the motor turned 2,700, and on flattening out the revolutions would increase to as much as 3,450. As the motor manufacturer recommended that the motor be run not higher than 3,200 for a period not to exceed five minutes it was deemed advisable to fly the ship in the race at half throttle. At this throttle setting the motor turned at 3,150 when the plane flattened out in horizontal flight, hence the speed was only 112 miles per hour around the course carrying a useful load of 200 pounds.

In the morning prior to the race this plane was unofficially timed once around the course in two minutes and six seconds wide open. This works out at approximately 142 miles per hour.

As a wooden propeller without tips was used it was found impractical to decrease the throttle setting sufficiently without killing the motor. This limited the possible top pitch for the propeller and therefore ran the revolutions up to such a high figure when flattening out.

It was found when increasing the pitch of the propeller above 3'6" it was not possible to set the plane on the ground without cutting the switch as the propeller pulled sufficiently with the minimum throttle allowed to keep the plane flying before the stall was reached.

The Heath Company is endeavoring to make an adjustable pitch metal propeller which will allow a further reduction of throttle whereby the pitch may be increased to 3'8" giving the plane added top speed and keeping the motor within mechanical limits.

The constructional details are more or less along conventional lines. The fuselage is of welded tubing from the pilot's cockpit forward, being further trussed with wire bracing.

Welded integral with the fuselage is an upright pylon which acts as an anchorage for the landing wires and at the same time eliminates all cross wires in the landing gear, as all side forces are transmitted through the wings to the upright pylon. This pylon streamlines into the general contour of the fuselage.

The longeron and pylon supports are constructed of ⅝-inch 20 gauge 1025 S.A.E. tubing. The rear of the fuselage is constructed of dural 17 S.T.

Welded steel fittings are shrunk and riveted to the rear longeron, and all cross struts in the rear are dural. Connecting wire bracing is then used throughout.

The tail surfaces are conventional welded tubing of very light gauges and diameter.

Tail skid is of the spring steel type mounted on the stern post.

There are two things that are unique in the construction of this ship in addition to its fine streamline form.

The first is the fact that all streamline wires terminate internally, either in the fuselage, landing gear, or wings. This required a departure from standard practice in the wing anchorage. Due to the amount of overhang or cantilever it was not considered advisable to have streamline wires pass through the center of the spar as was practiced in the Curtiss Navy racers, but to have an anchorage straddle the spar would expose the terminals. It was therefore advisable to have anchorage at a place where it pulled from one side of the spar only. This would develop considerable eccentricity and torsion in the spar. This was eliminated by placing a steel bulkhead at the point of anchorage; on sand test it showed up to be as strong as was possible with the fittings straddling the spar.

The other unique feature was that no shock absorbers were used on the landing gear. The particular truss layout made it impractical to use shock absorbers and there was some little apprehension to landing without shock absorbers at such a high speed. Since the ship was very light, however, no difference was noticed on account of lack of absorbers even with the small tires.

Neither spreader bar or cross wires are used in the landing gear. A streamline tie-rod which takes all the wing load, as well as all four flying wires, terminates in the hub of the wheels thus covering the bulky terminals of the streamline wires. Two sets of wheels were built with the plane, one set 18 by 3 and a set 15 by 2½. Due to the fact that the plane had considerably more speed than was necessary, it was felt inadvisable to use the smaller wheels.

The following are the general specifications of the Heath "Baby Bullet":

Specifications

Span	18 feet
Chord	3 feet 6 inches
Wing section	St. Cyr 52
Angle of incidence	0 degrees
Aileron area	5 square feet
Elevator area	3 square feet
Fin area	1 square foot
Rudder area	2¼ square feet
Length Overall	13 feet
Height	4 feet
Weight (empty)	235 pounds
Useful load	300 pounds
Gasoline capacity	4½ gallons
Oil capacity	3 quarts
High speed	150 miles per hour
Landing speed	55 miles per hour
Cruising radius	300 miles
Ceiling (estimated)	14,000 feet
Engine	Bristol Cherub 32 h.p. at 2,900

B.B.T. DUAL PURPOSE LIGHT FOR AIRPORTS

A NEW auxiliary landing field light which employs only a 2,000-watt lamp has just been announced by the B. B. T. Corporation. It is called a dual purpose light because it can be mounted on top of the regular air mail type M-8-D, or intermediate air mail type H-8-D landing flood lights. It can also be used for temporary illumination prior to the requirements for installation of a major flood lighting system.

The new dual purpose light employs the Fresnel hand cut lens for the 180-degree distribution of light. This lens cuts off sharply the top of the light beam.

The new light can be used for illumination of areas between the hangars and the lighted field for the handling and maneuvering of ships, passengers, mail and express.

"DOT" GREASE PUMP

THE Dot Little Giant grease pump, manufactured by the Dot Lubrication Division, Carr Fastener Co., Cambridge, Mass., is a simple, rugged, easily operated hand pump, developing up to 10,000 pounds pressure without the use of a booster nozzle.

The foot plate is of hard wood. The entire pump unit swivels in the grease tank so that the handle may be worked at any angle to the base without changing the position of the pump.





Mr. E. B. Heath and his miniature racing plane which was flown at a speed of 142 miles an hour

Scarab



The American Moth Monoplane which won first place in the Class A Los Angeles to Cincinnati Air Derby

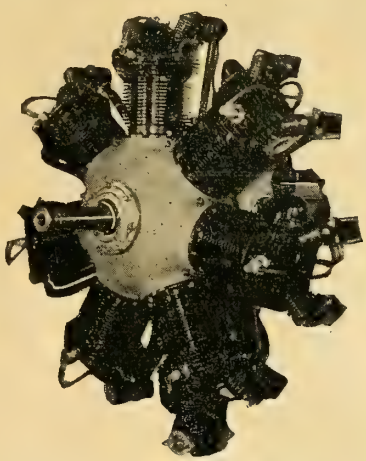
ANOTHER WARNER VICTORY

Warner "Scarab" powered planes, after taking first four places in the Class A New York-Los Angeles Air Derby, and after winning the closed course race at the National Air Races, captured

FIRST PLACE
SECOND PLACE
THIRD PLACE

in the Class A Los Angeles to Cincinnati Air Derby, concluded Sept. 23. For an unusual achievement covering both performance and stamina, this Warner accomplishment is unparalleled in the history of this type of engine.

Place	Plane	Pilot	Engine
1	American Moth	Robert Dake	Warner "Scarab"
2	Stinson Jr.	G. W. Hopkins	Warner "Scarab"
3	Challenger	Ted Kenyon	Warner "Scarab"



110 H.P. 1850 R.P.M.
Approved by Dept. of Commerce
WEIGHT, 270 LBS.

THE WARNER AIRCRAFT CORPORATION
Detroit - Michigan
U. S. A.

WESTERN NEWS

BROCK AND SCHLEE BREAK AMERICAN DURATION RECORD

WILLIAM S. BROCK and Edward F. Schlee broke the American duration record at San Diego on October 1, when they completed a flight of 59 hours, 30 minutes, in their Whirlwind powered Bellanca monoplane. The fliers used 560 gallons of Union aviation gasoline, and four gallons of Union lubricating oil during the long flight.

The former American record had been held by Eddie Stinson and George Haldeman, but this fell six hours before Brock and Schlee came down at Rockwell Field, North Island, their tanks empty.

While Brock and Schlee alternated at the controls during the long flight, their only means of contact with the world was provided by Ted Lundgren, aviation representative of the Union Oil Company. Lundgren painted on the side of his plane signs which told the fliers of coming weather conditions. On the last day one of these signs read: "500—E. N. E.—6M", which meant that at an altitude of 500 feet the fliers would find an east by north east breeze blowing six miles an hour.

Immediately after they landed, Schlee announced another attempt will be made to capture the world record of 65 hours, 25 minutes, now held in Germany. They plan to install additional gasoline tanks in the wings to increase their flying range by 10 hours.

SANTA MARIA MEET

By FRANK E. SAMUELS

THROUGH the courtesy of the Aero Corporation, I had the privilege of attending the dedication and races at the Santa Maria airport in that company's Fokker Super-Universal, piloted by Paul Richter. The air meet was held under the auspices of J. Allan Hancock and the Santa Maria Chamber of Commerce.

Fifty planes were present, among which were Navy planes from San Diego, Army planes from San Francisco and commercial ships from all over the coast.

About five thousand persons witnessed the races and exhibition flying. Al Wilson gave a stunting exhibition in his Curtiss pusher type plane, and Army and Navy pilots put on demonstrations of aerial combat maneuvers.

The winner of the race for 800 cubic inch open cockpit planes was H. C. Lippiatt in a J-5 Travel Air. His time was 12:27 minutes. George Marvis in a J-5 Eaglerock came in second, (time, 14:12), and third, Hal Rouse in a J-5 Stearman, (time, 15:09).

The OX5 race was won by Leo Nomis in a Travel Air, (time, 17:26); with Fritz Secor in an Eaglerock, second, (time, 17:26¼); G. R. Vaughan in a Waco, third, (time, 17:32), and Dick Ranaldi, Waco, fourth, (time, 18:01).

Fritz Secor won the dead stick landing contest in his OX-5 Eaglerock (distance, 1 ft. 4 in.); Leo Nomis, Travel Air, second, (distance, 1 ft. 8 in.).

In the light plane race, August Clancy in a Monocoupe was first, (time, 16:23); Joseph Clancy, Monocoupe, second, (time, 16:51); N. G. Mead, Golden Eagle, third, (time, 18:05).

There was also a speed and efficiency race and a race for Curtiss Hawks, the results of which are not yet available.

All races were over a three-pilon course, twenty-five miles each.

To J. Allan Hancock goes the credit for the best privately-owned flying field meet ever held in Southern California.

HONOLULU AIR NEWS

BY VERNE HINKLEY

HAWAII has welcomed with real interest the news that Captain Charles Kingsford-Smith and his aide, Charles T. P. Ulm, heroes of the flight of the *Southern Cross* to Australia, may attempt a cruise by air from these islands to the Pacific Coast.

Announcement recently of tentative plans for such an effort has once again brought very prominently to view the need for larger airports in and about Honolulu. There is today but one field in all Hawaii where the *Southern Cross,* laden for a California flight, could get into the air. That is at the Barking Sands, Island of Kauai. Hilo, which recently dedicated a new airport, is making plans for the lengthening of its runway from 4,200 feet to 10,000 feet, but such an improvement, still only in the paper stage, could not possibly be finished for another two years.

SEVERAL Honolulu residents went to Los Angeles late in August to take in the National Air Races. Among them were Captain Lowell H. Smith, now stationed at Wheeler Field, Charles H. Dolan, Jr., who is making an air survey for the Inter-Island Steam Navigation Co., and A. W. Van Valkenburg, of the Honolulu chapter of the N. A. A.

AFTER having been flown more than 35,000 miles, the army's trans-Pacific monoplane, *Bird of Paradise,* is undergoing a thorough teardown and overhaul at Wheeler Field. According to Air Corps officers, not the slightest sign of wear or weakness has been found in the big ship, the first to cross the western ocean from California to Hawaii.

KEYSTONE bombers of the Army Air Corps were used as messengers of mercy here early in September when two of these ships, each carrying a Honolulu physician, were flown 200 miles to Hilo that the doctors might attend a Hilo business man who was seriously ill with pneumonia. The ships made the trip against heavy headwinds in four and one-half hours, but returned the following day in less than three hours.

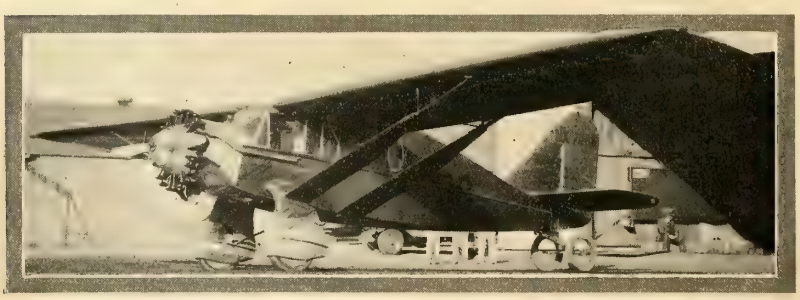
The Honolulu doctors were successful in saving the life of their patient.

SIX enlisted men of the Air Corps at Luke Field have passed the preliminary tests and have entered the West Point preparatory school which is conducted annually at Schofield Barracks. The men were chosen from a large number at the field who wished to take the examinations. They are Privates Ira Bashein, Duval L. Christ, Edward Flanick, Gordon Harris and Lyle F. Johnson, of the 65th Service Squadron, and Private John Highfield, of the 23rd Bombardment Squadron.

At the close of the school six months hence, those who have measured up to the required standard in all courses will be eligible for appointment to the U. S. Military Academy.

SUMMER rest camps for Luke Field personnel have come to an end with the return to duty of seven officers, who went with their wives to Waimanalo, windward Oahu, as the last of a large group of Air Corps people to enjoy beach vacations. The 4th Observation Squadron was the last regularly constituted unit to use the camp, the seven officers and their families moving in when they vacated.

During the vacation season all transfers of personnel from Luke Field to Waimanalo and return, 25 miles across the Koolau mountain range, were made by air. The Waimanalo field, situated on the sand dunes beside a wide bay.



The Bellanca plane used by Brock and Schlee for their 59½-hours flight

DEPENDABILITY WHEN METAL CONTACTS METAL



THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

"THERE is no economical substitute for quality." This since the inception of the Axelson Machine Company, nearly forty years ago, has been the standard for production. In the manufacture of the Axelson Airplane Motor this same high standard for quality, in *workmanship* as well as *materials*, stands as the foundation upon which Axelson builds both *dependability* and *durability*.

In the production of parts, where metal is forced to contact metal in the generation of power, the degree of dependability is measured by *durability*. To attain these essential elements Axelson not only employs the use of selected, metallurgically proven metals of more than required strength, but Axelson metallurgists introduce a special method of heat-treatment in the application of extremely hard surfaces to such parts.

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(The Second of a Series of Advertisements Pertaining to Axelson Scientific Production)

CONTACTS

By Frank E. Samuels

I HAVE just returned from a trip south, visiting all of the manufacturers, airports and flying fields between here and San Diego, and driving from the latter to that beautiful Mexican resort, Aqua Caliente (Hot Springs), where the Maddux airliners make a point of call on their daily trips from Los Angeles to Ensenada, Mexico. During my short call at the flying field there, one of the line ships, a brand new Lockheed cabin plane, landed with a full load of passengers piloted by Al Wilson, who has given up stunt flying and is now regularly piloting one of the big ships for the Maddux Air Lines.

Leaving Los Angeles early in the morning, I made my first stop at the Long Beach Municipal field, which I consider to be the most progressive airport in this section of California. The runway has been lengthened to almost double its original length; new hangars are being erected from day to day; manufacturers are building planes; flying schools are connected with almost all of the hangars; and across from the commercial side of the field are the Naval Reserve quarters, with their fine buildings and nicely laid out grounds and hangars.

The Crawford Airplane Manufacturing Company at Seal Beach was next on our calling list. There is a landing field there with a runway long enough to accommodate the largest airplanes. Mr. Crawford promises us a sensational announcement for the near future.

Just a short distance to the Fullerton Municipal Airport, our next stop, where we met Bill Downing and Willard Morriss, who are in charge of the field and run a school of instruction. The boys report business as being better than good, as it should be, for both of the boys are well liked and are conscientious instructors.

Then another short jump to the Eddie Martin Airport, Santa Ana. Eddie and his brother, John, although both of them were very busy, stopped long enough to tell us the good results they are receiving from their little ad in Aero Digest. Their machine shop is running overtime, and student instruction was never better.

While at Santa Ana, we went uptown and visited the Kinslow Machine Works, manufacturers of the Vitalite pistons. Mr. Kinslow took us through the plant, explaining the materials and process of manufacture. The amount being turned out daily was a surprise to us.

Another hop and we were at Midway City, a short distance from Huntington Beach, where the Albatross monoplane was built. Mr. Peterson, designer and builder, is just finishing a lighter plane for passenger service—a cabin job on the lines of the Albatross. The flying field at the plant is in perfect condition.

At San Diego our first stop was at the B. F. Mahoney field, where Lindbergh took off on his wonderful flight. To say that they were busy at the field is putting it mild, for this is one spot where they are never anything else but. The line of Broughams already sold and being tested before delivery to the owners bore evidence of the large production basis on which the company is working.

Adjoining the Mahoney Field is the airport and flying school of T. Claude Ryan, one of our oldest instructors and manufacturers. The field is being equipped with new hangars, shops and an administration building. The ships are all new, and the entire plant spells efficiency and good management. The Maddux Airliners arrive and leave here daily on their regular trips south and north.

On the way into town, right on the bay, is Lindbergh Field, the new San Diego



Bob Blair

Municipal Airport, where the San Diego Air Service Corporation makes its headquarters and, in fact, dominates the field with its new equipment, shops, fireproof hangars and uniformed attendants. Travel Air biplanes with Warner Scarab engines are used exclusively for student instruction and passenger service, with Doug Kelly as chief pilot.

Just beyond Lindbergh Field are the offices of the Pacific Technical University, where we made a short call. Although this is a new departure in the aeronautical world, the progress that the university has made in a few short months is really remarkable. Student enrollments are coming in faster than ever anticipated, and everyone is pleased with the progress made.

A little farther and we came to the big building that houses the Russell Parachute Company. Mr. Russell has enlarged his plant until it now occupies the entire top floor of the building. With the present equipment and floor space, the company's production is limited only by its orders, being able as it is to turn out from 120 to 200 parachutes a month. During the summer, a British branch of the company was opened and has proved highly successful.

A visit to San Diego without calling on Major H. A. Erickson, the flying photographer, would be like dinner without dessert. The school of aerial photography conducted by him is proving highly successful. The Middle West is represented by Merle Oelke from Iowa, who will be graduated this month. One of the earlier students obtained a highly satisfactory position with one of our large oil companies. By the way, Major Erickson recently flew and delivered to his client in five days from the time the contract was signed an air survey of over 100 square miles north of Santa Barbara.

While we were in San Diego, where news is always abundant, some very interesting items were brought to our attention. Tom Mathews of the Mahoney-Ryan Aircraft Corporation is responsible for the following squibs: Bill Monday, who recently established an unofficial world's altitude record of 24,100 feet in a Ryan Brougham, is making a tour of the United States with Graham Dible, owner of the San Diego Exclusive Florist Shop, and D. W. Campbell of the San Diego Chamber of Commerce. G. A. (Buddy) Jones is operating a Brougham throughout the mid-west, as Mahoney-Ryan factory contact man, with headquarters at St. Louis. Bob Adams, sales representative was present at the opening of the new Orlando, Fla., airport and has been contacting dealers in the southeast during the past month. The St. Louis factory is getting several Ryan Broughams ready for the Chicago Aircraft Show, to be held in December. S. C. Breder, sales manager, is traveling by plane throughout the northwest, building up the distributing organizations.

TOM COLBY, the well known manager of Berry Bros.' aviation department, is piloting his Buhl Airsedan all over Southern California, making more and more friends at every port of call. When in Los Angeles, Tom parks his Airsedan, in which he flew his 65-year old aunt, Mrs. Edw. Pendleton, across the continent in the Class C air derby, at the Buhl Pacific Airport. By the way, Bob Blair has taken over the airport by himself and is now sole western representative of the Buhl Aircraft.

THE students of the Universal Institute of Aeronautics have recently formed a club, the main object of which is the promotion of aeronautical education. Two meetings will be held every month, and at these meetings lectures covering various subjects dealing with aeronautics will be delivered. Meetings will be held at 8 p. m. on the second and fourth Wednesday of each month in the main lecture hall of the Universal Institute. The club is to be operated entirely by the students of the institute.

WHILE at the Bach Aircraft plant, I had the pleasure of looking over their latest three-motored transport, and a beautiful ship it is. With a Pratt and Whitney Wasp in the nose and two new Comets under the wing, it is equipped with all the latest instruments, and the interior is fitted up like a private yacht.

Mr. Bach reports that work has started on the company's new manufacturing plant at the Los Angeles Metropolitan Airport, in San Fernando Valley, and that they expect to move over there about the first of the year. The plans show an up-to-date plant, laid out for efficiency and rapid production.

(*Continued on next page*)



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The 1929

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IN this superior product, greatest efficiency is offered at lowest cost. Rapid opening, slow rate of descent and minimum oscillation are other features which commend this particular parachute to *experienced* as well as *inexperienced* flyers.

This parachute is 100% manually operated. You simply pull the release ring—the parachute does the rest. No springs, no rubber bands, no pilot chute—nothing to get out of order.

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Manufactured by the

RUSSELL PARACHUTE COMPANY
SAN DIEGO, CALIFORNIA

Say you saw it in AERO DIGEST

(Contacts continued)

AT the Aero Corporation field on Western Avenue, a Super-Universal Fokker has been added to the fleet of airplanes. This ship has been put into regular service on the Standard Airlines.

A wide band of brilliant orange around the wing tips of planes belonging to the Standard Airlines has been adopted by that company as an official insignia. This orange band is visible from a great distance and serves to distinguish easily Standard Airlines planes.

PILOT E. BURRELL SMITH, the flying salesman for the Aero Corporation of California, plans to start on another extensive flying tour through the State of California. On this trip Mr. Smith will fly a new Eaglerock powered with a Hallett engine and will land at every airport in the State. Prepare to meet AERO DIGEST's Western representative, for we hope to make the trip with Mr. Smith.

ROGERS AIRCRAFT, INC., California distributor of Stearman Aircraft, has during the past month, sold three Whirlwind-motored Stearmans. H. J. Barneson, Los Angeles broker, purchased one for his personal use; Mr. Dan Emmett, State Legislator from Santa Maria, another for his personal use, and G. Allan Hancock, the third, to be used on his flying field for student instruction.



Combination sign and signal

A. A. CLARK, director of aeronautics, Visalia Chamber of Commerce, has introduced a new combination sign and signalling device which is now in use at Visalia airport.

The signals (several of various patterns may be used on one apparatus) are of canvas and attached to rollers at the top. Any one of these signals when needed may be lowered over the sign like a curtain. When not in use, however, they are concealed by a metal hood, and the sign is then exposed to view. Provision is made for illumination of both the sign and signals at night.

STANLEY SHORT, at Short's Airport, has a waiting list of students who are anxious to start taking instruction, but Stanley has only one other pilot instructor beside himself and will not take on any more students than the two can give proper and conscientious instruction.

OVER at the American Aircraft Corporation's airport, they report that the Santa Maria Air Lines, recently organized by G. Allan Hancock, local banker and backer of the *Southern Cross* flight to Australia, has purchased two Waco-10 biplanes from American Aircraft. The newly organized company will operate a flying school at Santa Maria in connection with its transport service. Wacos will be used for training.

TWO new airports have opened recently on Angelus Mesa Drive—the Monoplane Aircraft Field and the Sperl Aero Corporation Field. The Monoplane Aircraft field is the West Coast headquarters of the Monocoupe, and the Sperl Aero Corporation field, of the Lockheed Vega and the Curtiss Robin planes. Mesa Drive is a busy place, aeronautically speaking. There are five airports within less than a mile, all adjoining. Last but not least is that of the Rogers Airport, where more different makes of airplanes can always be found than, we believe, in any other airport in the West. Transport liners leave here daily, and few visiting planes ever find any other airport except that of Jim "Personality" Webster.

ARRIGO BALBONI has taken unto himself a business partner. He also has taken the agency of an airplane for the entire Pacific Coast. He and Mr. Walter, his new associate, went East and returned with the agency of the Airmaster.



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a warm
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It is a widely recognized fact—RYAN STUDENTS ARE BETTER TRAINED! Ryan graduates, by virtue of their long, thoro training with complete equipment under competent instructors, are better qualified to fill the important flying and executive positions which are opening up on every hand.

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No delays, no inconveniences. Every day is a flying day in San Diego! No winter—no sleet, slush and snow—no freezing temperatures—no high winds or storms. That's why U. S. Government flying activities are centered here, and why 42 world's records in aviation have been broken here.

NOTE:

T. C. Ryan Flying School is under the personal supervision of T. Claude Ryan, founder of all Ryan Aviation Activities in San Diego.



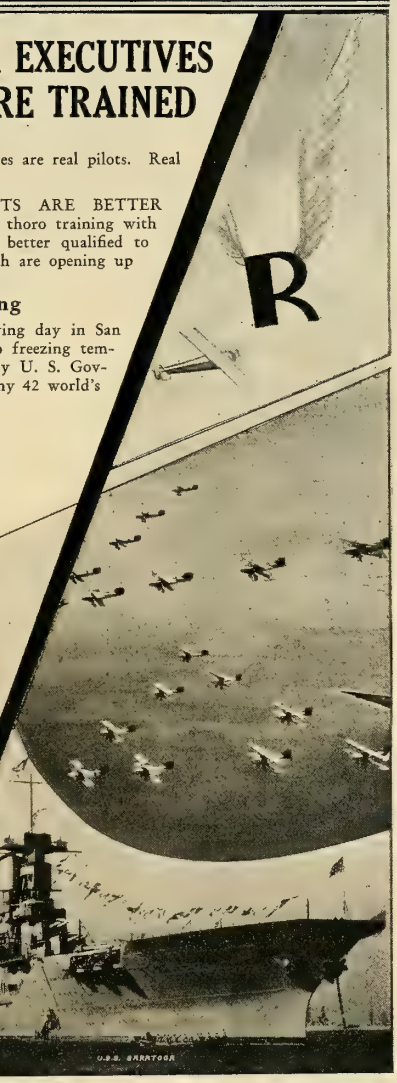


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Also a Private Operator's course, covering two months—with 20 hours in the air and primary ground training. Also *Advanced Work* for those who have had previous training.

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Gentlemen: I am interested in your course of flying instruction. Please send me your catalog.

Age.....

Name ..... Address .....

Say you saw it in AERO DIGEST

CALIFORNIA AIR NEWS

BARNEY OLDFIELD has been elected to the board of directors of the American Eagle Aircraft Corp.

ASSOCIATED AIRCRAFT, of Hollywood, is the southern distributor of the American Eagle, and sole licensee of the Rankin System of flying instructions for the same territory.

E. S. Pillsbury, 2nd, is president of the Company; Eddie Pullen, former racing driver, is vice president; and Donald Scoles is second vice president and manager. Among the directors are F. W. Sutton, former general superintendent of Dayton Wright Airplane Company, P. L. Burkhard, Byron Williams and Allen Murphy.

The corporation owns the Eagle Airport at Ventura Boulevard and Whitsett, and expects to operate on five airports in the metropolitan area of Los Angeles.

The dealer policy of the Associated Aircraft, Inc., contemplates the establishing of branch schools in all important communities of Southern California, at which the Rankin System of flying instructions will be used.

Stoody Fokker on Transcontinental Flight

A TRANSCONTINENTAL flight, with the purpose of carrying on business and promoting aviation in the welding industry, is now being carried out by the Stoody Company of Whittier, California.

This flight, which is one of the first of its kind in the history of western aviation (inasmuch as the plane, in the use of a private concern, will visit some twenty cities before returning to the West Coast), marks an advance in the transactions of business by airplane.

The flight started from Vail Field, Los Angeles, on September 29th, and will conclude within thirty-five days. The Wasp-powered Fokker will visit San Francisco, Salt Lake City, Denver, Kansas City, Chicago, Milwaukee, Detroit, Cleveland, Pittsburgh, New York, Philadelphia, New Orleans, and Tulsa.

Upon the plane's arrival at Tulsa, the Stoody interests will use it for courtesy trips for guests of the company at the International Petroleum Exposition.

J. C. Blake, sales manager of the Stoody Company, and Chester Mott, vice president of the Purox Company, are passengers on the trip. Vernon Dorrell is piloting the ship as the official Stoody pilot.

THE Dycer Airport (Los Angeles) entry in the California race at the National Air Races finished in second place. The plane, a Lincoln-Page powered with a Curtiss OX-5 motor which was specially constructed at Dycer Airport, was piloted by Charles F. Dycer and flew at an average rate of 118 miles per hour. Due to its special construction, the OX-5 used in the race showed an increase to 112 horsepower over the original stock rating of 90 horsepower. As a result of this performance, Dycer reports a brisk sale of Lincoln-Page planes.

M. E. HULSE of Oakland, Calif., while at the exposition, closed with the Nicholas-Beazley Company for the exclusive distribution for eastern United States for the new dictator goggles.

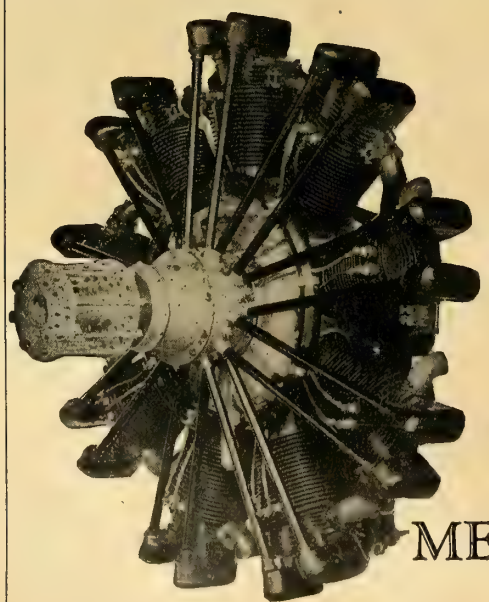
The "Legion of Western Wings"

THE students of the Western College of Aeronautics in Los Angeles have organized a club for school members only, called the Legion of Western Wings. It is the belief of the faculty of the school that such an organization in the social life of the college will serve to develop a fine spirit of camaraderie and also increase interest in study work.

The purpose of the Legion is primarily to promote and encourage meetings of an educational nature wherein aeronautical subjects not given in regular lecture routine may be thoroughly discussed. The club also affords entertainment, rest and recreation for members in its finely equipped club rooms.

UNITED AIRCRAFT CORPORATION, a company which will deal in aeronautical accessories, was recently organized in Oakland. The new company will handle the complete line of supplies of Nicholas-Beazley Airplane Company, Inc., of Marshall, Mo. A new building planned will contain 20,000 square feet of floor space for warehouse and sales offices. Charles L. Henck is general manager.

Dependable POWER



Model B 2

... and long life

BY all means investigate the Menasco-Salmson nine cylinder radial aero-engine if you are looking for operating efficiency at all times and under all conditions.

This powerful superposed engine possesses engineering perfection of the finest degree, insuring dependability and long life.

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LEARN TO FLY without the nazard of icy blasts and biting cold; of snow and sleet. Train in San Diego where sunshine spends the winter.

On Lindbergh Field you will have at your disposal the latest of modern equipment used exclusively for pilot training. A fleet of Travel Air training planes, each powered with a Warner Scarab engine. Shops completely equipped for the maintenance or entire construction of modern aircraft.

Air Service Training provides a curriculum of exactness available only under the leadership of military trained instructors. Covering in thorough detail the scope of ground instruction and flight training, this system is the product of experience in producing pilots competent to meet the strict requirements of modern aviation.

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SACRAMENTO AIR NEWS

By Ralph K. Clark

HARRY CULVER, president of the California Real Estate Association, flew here recently from Culver City to attend the association's convention which was held here. Culver flies his own Stinson-Detroiter.

AMONG the several additions made recently in the aviation curriculum at the Galt Junior High School is a course which includes instruction in radio communication between airplanes and the ground.

A complete sending and receiving set has been installed on the American Eagle plane belonging to the school, and flights are made during which constant communication with a station at the field is maintained. Students are given a thorough course in airplane radio construction and installation, as well as operation.

Development of the school's airport is progressing rapidly. The field now has two runways—one running north and south, and the other running northeast and southwest. Both have been graded and will be oiled soon. The runways are each approximately 2,000 feet in length.

William Rutherford, principal of the school and head of the aviation department, reports that an observation balloon has been donated to the school by the United States Army. The balloon will be used in the school's aviation weather forecasting courses.

The Galt Junior High School is the first public school in the United States to offer aviation as a part of its regular curriculum.

THE building of a municipal hangar is in prospect for Benton Field, Redding's municipal airport. Plans for the weather bureau building have been drawn and have received the approval of the city council. This building will be constructed at once.

DR. W. H. CROSWHITE of Lodi, San Joaquin County, has been appointed a member of the aviation committee of the California Affiliated Exchange Clubs.

This committee is to make a survey of all cities in the state that have Exchange Clubs and coöperate in promoting ways and means for securing town markers, airports and landing fields.

JACK WALSH of the Goddard Aircraft Company of Oakland was at the Eaglerock Airport recently, demonstrating the Monocoupe which his company sells.

Walsh reports several sales of ships were made there. One will be delivered shortly to the Harts' Cafeteria Company for use in transporting its auditor between Fresno, Modesto and this city, where the company operates cafeterias.

SIX THOUSAND people from Chico and all cities in Butte County visited the Chico Air Show, which officially dedicated that city's new airport. The event was staged under the auspices of the Sierra Aircraft Corporation.

COLORADO AIR NEWS

By Robert C. Cleminson

J. M. (PAT) PATTERSON, chief pilot for the Rocky Mountain Airlines, has signed a six-month contract with the Yukon Airways and Exploration Co., Ltd., of Whitehorse, Yukon Territory. Patterson and Clyde G. Wann, operations manager of the company, are now ferrying the company's new Whirlwind Eaglerock to Whitehorse. They plan to use the Eaglerock, in addition to the Ryan Brougham already owned, for air mail, passenger and express, and intend also to rent the ship to hunting and prospecting parties.

Lt. Harvey H. Montague has succeeded Patterson as chief pilot for the Rocky Mountain Airlines.

TEST flights of their new Silverwing monoplane have been made by the Silverwing Aircraft Corp. C. F. Sackett is president of the company, and H. C. King, vice president and designer. Jack Euler is chief pilot. The ship is a high wing monoplane powered with a Hisso motor.

THE Denver Aircraft Sales Company has been organized by Fred E. Jacobs and Royal Leonard. They have secured the agency for the Lincoln-Page.

WORK will soon be started on the Denver Union Airport. The field will be leveled, a new hangar built for visiting ships, and lights installed. Lt. Ralph Hall is general manager of the airport.

Announcing . . .

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LAIRD AIRPLANES

Built by E. M. Laird Airplane Co., Chicago

A Custom Built Job
For Those Who Want the Best

Flying Field and Hangar: Long Beach Municipal Airport
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$20 Blue Ribbon Flying Outfit



Introductory Price..... **$14.95**

Suit Helmet Goggles

Save 25% on this practical, high quality outfit. Consists of one $6 Blue Ribbon glove [illegible]de helmet, in brown, gray or tan, lined with [illegible]am-ois, one pair of $6.50 Dictator goggles, and $7.50 Blue Ribbon flying suit of either khaki drill or white duck. Double stitched and cut roomy throughout. Specify sizes and colors. Helmets from 6¾ to 7½. Suits from 34 to 44. Limited offer. Order now. Send no money.

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Commercial Aviation
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METEORPLANE
WORLDS FIRST LIGHT PLANE
1 AND 2 PASSENGER SINGLE MOTOR TYPES
2 AND 3 PASSENGER TWO MOTOR TYPES
IRWIN AIRCRAFT CO
ESTABLISHED 1908
SACRAMENTO
CAL.

Say you saw it in AERO DIGEST

LOS ANGELES METROPOLITAN AIRPORT

wishes to cordially welcome the

Bach Aircraft Co.

For whom construction work is now under way on their first $50,000 factory unit on their site procured on the Los Angeles Metropolitan Airport.

Richfield Oil Co.

Who are now building their first installation of a model service station for the merchandising of all aircraft petroleum products.

LOS ANGELES METROPOLITAN AIRPORT

Wishes to thank the following companies for their cooperation and the furnishing of equipment for the development of our project.

B. B. T. Corp.—Airport Flood Lights.

Crouse-Hinds Co.—Airport Beacon.

General Electric Co.—Hangar, flood, ceiling and boundary lights.

Austin-Western Co.—Roller and grading equipment.

Ford Motor Co.—Tractor and truck equipment.

Toro Mfg. Co.—Sprinkling systems.

Aggler-Musser Seed Co.—Runway sod.

Geo. A. Chapman—General contractor—Airport buildings.

Richards-Neustadt—Architectural drawings.

Pacific Iron & Steel Co.—Structural steel.

Miller and Burke—Decomposed granite.

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Airport Phone
Van Nuys 522

IDAHO AIR NEWS

By Ida M. Durnin

THE Eastern Idaho Air Service, Inc., whose landing field at Pocatello is being managed by Calvin Moser of the M. and H. Service station, has purchased a Swallow plane and is using it for training purposes. J. W. Hackbarth has charge of the flying instruction.

CONSTRUCTION of the first of two airplane hangars to be erected on the Kellog and Osburn landing fields has been started.

Work on oiling the Osburn field was completed recently by the state highway department in coöperation with the county. The Kellog field is now being oiled.

PRIEST RIVER recently purchased a 40-acre tract for an airplane landing field.

HITHERTO inaccessible regions in the Salmon River country of Idaho are now open, by means of airplane, to the nimrods of Spokane, Grangeville and contiguous territory. The Mamer flying service of Spokane has established a route to the Chamberlain basin country.

AIRPLANES flying over Idaho Falls will have little difficulty in finding their location. A sign, 153 feet long, 16 feet 5 inches high, and an arrow the length of the sign, all in a conspicuous position, and showing the name of the city and direction to the landing field, was completed recently.

THE Dean Flying Service of Twin Falls was incorporated recently by Lionel A. Dean, Thelma A. Dean and George W. Dean.

Idaho Air Circus

IDAHO'S first air circus took place September 29th at the Boise municipal airport.

The planes present represented the army unit at Spokane, the Thompson service of Salt Lake, the Pocatello air service, and the Nampa flying service. There was also a private plane piloted by Bill Gowen of Caldwell, Idaho, and the Varney air mail service.

THE Boise airport lighting system was dedicated on September 29, following an air circus on the 28th.

Governor H. C. Baldridge, Mayor Walter E. Hansen, S. W. Worthington, W. T. Lockwood, secretary of the Boise chamber of commerce, and Charles T. Whighson, of the Varney air mail service, spoke at the dedication.

UTAH AIR NEWS

By Glen Perrins

FURTHER steps to make Salt Lake airport a mile square were taken recently when the city commission approved the purchase of two tracts totaling 120 acres, which are to be added to the field area on the western side. An appropriation of $3,200 was made for the purpose.

Signs to guide air travel to and from Salt Lake are being painted at places where pilots may see them. One sign on the huge Mormon tabernacle has already been completed.

H. J. MERCHANT, Los Angeles passenger traffic representative of the Western Air Express, is in Salt Lake City studying the feasibility of opening a daily passenger service to replace the bi-weekly service now in operation between the two cities.

RETURNING from a six weeks' survey of emergency landing fields along the air mail route between Salt Lake and Cheyenne, Wyoming, H. F. Mummert, assistant airways engineer of Lighthouse Division, announced that new landing fields are to be located at Lyman and Medicine Bow, Wyoming.

Fields now located at Knight, Leroy, Bitter Creek and Walcott, Wyoming, have been enlarged to take care of the larger planes now operating over this route.

Night flying will be in operation November 1, and thirteen new beacons have been ordered installed.

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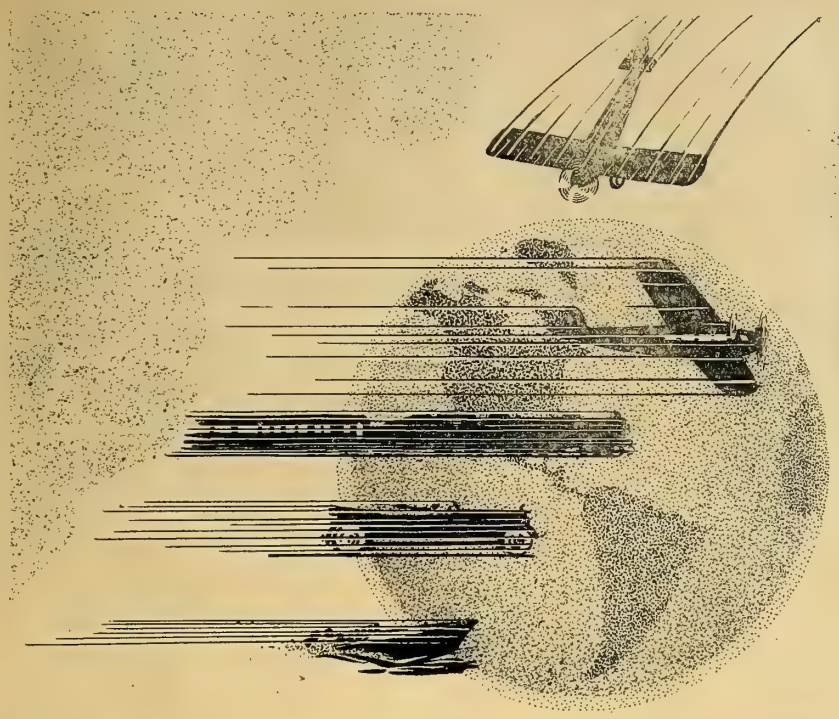
NOW – You Can Answer This Question to Your Own Satisfaction!

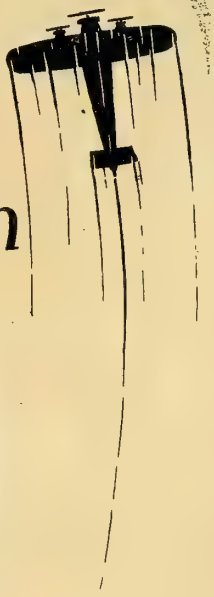
In order to Help You answer the above question, we have prepared a simple tentative EXAMINATION QUESTIONNAIRE consisting of twenty-five SOUND QUESTIONS on preliminary Aeronautics—If you can answer these questions correctly—YOU CAN LEARN to FLY. *Send for Your copy of this FREE Questionnaire Today!*

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City .....
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NORTHWEST AIR NEWS

By F. K. Haskell

PLANES of the West Coast Air Transport Company, coastwise air passenger and express line, carried 903 passengers and flew a total of 26,326 miles in September, according to Charles V. Eakin, president. The Bach monoplanes were in the air for a total of 240 hours. In this time there were no motor accidents or motor failures. Only three days of flying were missed during the month because of poor visibility.

OREGON now has 21 airports and landing fields recognized as such by the Department of Commerce, and an additional 15 ports will shortly be added to this number.

JOHNNY WEST, stunt flier of Portland, Ore., has invented a control cutout which, according to his calculations, will void the dangers connected with "freezing" to the control stick.

The device is constructed of aluminum, with its lower section designed to fit into the floor control socket of a plane and its upper part, working on a ball and socket joint, arranged to hold the control stick. Fitting into the ball and socket joint is a tapered U-pin, declared to be the safety factor of the invention.

The device is for use in the usual dual-controlled instruction plane. Should the student "freeze" to the control stick, the pilot pulls a cable attached to the U-pin of the safety cutout, drawing the U-pin from the ball and socket joint and thus disconnecting the control.

THE giant 10,000,000 candlepower aviation beacon of the Standard Oil Company on Council Crest, 1,280 feet above Portland, Ore., was dedicated during the week of October 7. In addition to this beacon, there are the letters "S O" in Neon tubing on the tower's sides.

THE Boeing Airplane Company has delivered a flying boat to Western Canada Airways, Ltd., which will be used for fisheries patrol at Prince Rupert. The craft is a five-passenger and pilot sedan-type boat equipped with a Pratt and Whitney Wasp engine.

THE Mackenzie-Morrow Aviation Company has transferred its planes to Swan Island airport. A number of new American Eagle planes for instruction purposes will be added to the equipment. Modern, well equipped shops will take care of the planes and provide students with laboratory training.

WEST COAST SERVICE, INC., has opened a factory in Portland, Ore., to manufacture planes. Officers of the corporation are M. G. Putnam, president; O. F. Bowers, vice president and J. Kisswetter, secretary-treasurer.

OREGON AIR NEWS

By C. K. Logan

BEND now has an airport on a field which members of the Bend Post, American Legion, have cleared of brush, rocks and trees. The field is equipped with wind indicator and a field marker.

THIRTY planes from Portland, Salem and Vancouver, Wash., attended the air derby that formally opened the Corvallis airport September 29 and 30. The ships included Wacos, Travel Airs, Eaglerocks, American Eagles, Monocoupes and Pintos, in addition to three army ships from Pearson Field, Vancouver, led by Capt. A. I. Eagle, commandant. The event was the second big air derby in the state. It was under the direction of F. E. Therkelson, Portland. The airport is sponsored by the American Legion, is well equipped with a hangar for two ships and runways approximately 2,000 feet long.

EXPENDITURE of funds of a municipality for the purchase of an airport is rightfully designated as a public purpose and city bonds may be issued for such a project without exceeding the authority of the constitution, according to a decision in the Roseburg, Ore., test case involving a $25,000 airport. Salem, which voted a $50,000 bond issue for a municipal airport, joined with Roseburg. The case has been one of importance to all Oregon cities that have been planning to issue airport bonds.



OX5 pistons, new, per set, $19.50
OX5 pistons, high compression, each, $4.75
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Hisso (Model A with E rods, blocks and pistons), from $700
Hisso (Models E & I) $800
Hall Scotts (in original crates) $175
Liberty cylinder assemblies (new and used), from . . . . . $10 to $50
Liberty Crank shafts (new and used), from . . . . . $50 to $150
Liberty pistons (high and low comp.) . . . $5
OX5 pistons, standard or oversize (high and low comp.) $3.50

OX5 wrist pins, 25c; lock screws, 5c; piston rings, 15c; valves, each, 60c; sets of exhaust and intake gaskets, 75c; water pipes, each, $3.50; hub pullers; hub wrenches; rocker arms; Jenny radiators, new and slightly used, $20 to $30; Jenny nose plates, $1.50; B. G., Mosler, and other high grade spark plugs, all guaranteed, 75c each; parts for all types of motors including Whirlwinds at greatly reduced prices.

ACCESSORIES

13 volt, 32 amp. streamline wind-driven generators, complete with storage batteries, automatic cutouts and propellers, originally cost $120. Money back guarantee $35
New storage batteries, 6, 10 and 12 volts $15
Jaeger, Reliance, & Warner Tachometer heads, $15; with cables and adapters . $20
Air speed indicators, complete $25
Pioneer Turn & Bank Indicators $35
Dual Magneto switches, from . . . . 75c to $2
Propellers, all types, from . . . . . $5 to $40

Altimeters, flight and bank indicators, oil gauges, compasses and instruments of all kinds at less than one-third list prices.
German ZH6 Bosch Magnetos $25
Berling and Dixie Magnetos $35
Berling and Bosch armature assemblies $7 to $10
Booster Magnetos $25
Zenith Carburetors from 1″ to 2¾″, $5 to $35
Hall Scott hubs, complete with bolts . . . $5
$20,000 stock of Dixie, Bosch, Berling, Victrix and other magneto replacement parts priced far below list.

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unlined helmets. You can pay twice as much and you can't buy more.
$3.50

Turnbuckles, Government specification, 15c to 50c; Nicholson bastard wood working files, originally cost $1.00, 25c; Axles, wheels, tires, tubes, bushings, hub caps, primers, dash lights, eye bolts, Government specification nuts and bolts, aileron hinges, fabric, tape, dope, needles, thread, nails, etc., all at greatly reduced prices.

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WASHINGTON AIR NEWS

By C. M. Litteljohn

RENTON now has an airport. This is the landing field of the Northwest Air Service Corporation just outside Renton, now renamed "The Renton Airport" and reclaimed as the thriving little coal city's very own.

WALLA WALLA AIRWAYS, INC., was formed at Walla Walla during October. The incorporators were Claude I. Henline, Winton C. Coogins, and Floyd O. Henline.

THE first branch ground school of the Commercial Air Transport Company has been opened at Sedro-Woolley by J. R. Scott, president.

Sedro-Woolley expects to have an airport by Spring.

RUNWAY marker lights are being installed at Boeing Field, Seattle, to provide better illumination and guidance for night flying. Green lights mark each end of both runways, while those along the sides are white.

A bond issue of nearly half a million dollars is being sought in Seattle for further development of Boeing Field, Seattle's municipal airport, and a vigorous campaign is being waged by the Seattle chapter of the National Aeronautic Association and others to have the matter placed before the voters in November.

A PLAN to purchase the Tacoma and Pierce County airport is under way in Tacoma. The aviation committee of the Chamber of Commerce is placing before the voters in November the matter of appropriating $300,000 by floating bonds.

A SECOND ground school is soon to be opened at Anacortes by the Commercial Air Transport Co., which is expanding rapidly under the presidency of J. R. Scott.

PURCHASE of the airport at Ellensburg is planned by the aviation committee of the chamber of commerce of that city.

PRELIMINARY organization of the Centralia Airways, Ltd., is now under way at Chehalis. The company will offer commercial service, as well as flying instruction.

SPOKANE AIRWAYS, INC., of Spokane, is expanding and plans to establish a branch and flying school at Lewiston, Idaho. The Lewiston field is being dedicated, which event may result in the establishment of a passenger plane service from Spokane to Lewiston and Walla Walla.

THE Totem Flying Club is a new Seattle organization composed of 100 Seattle business men and air technicians. They will open their own flying school January first. C. R. Pearson is president, and Victor Nelson, secretary.

ANOTHER new company to start the construction of planes in Seattle is the Clifford Aircraft Corporation, of which C. B. Limpright is secretary and treasurer. A monoplane is now being constructed in the company's plant.

A BRANCH of the Hobi Airways Co., of Aberdeen, is planned for Eugene, Ore., where the company has acquired exclusive rights for the operation of the Eugene municipal airport.

ARIZONA AIR NEWS

By "Wind Sock"

THE landing field at Rocky Point, Mexico, is now ready to land on. The Gulf Fisheries Corporation dedicated the field the latter part of October.

Plans are under way now to establish passenger service between Ajo, Phoenix and Rocky Point, Mexico, where the Gulf Fisheries Corporation has erected a club house for its stock holders.

A NEW air mail route is to be inaugurated through southern Arizona on January 1. The route will take in the following cities: San Diego, Yuma, Tucson, Douglas, El Paso and Fort Worth. A feeder line from Flagstaff, through Prescott and Phoenix, to Tucson will take care of northern Arizona and all the mining towns, and make it possible for these towns to get air mail.



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A Millerized OX-5 represents the last word in reliability, efficiency and economy. Thousands of OX owners are now reaping the harvest from this knowledge.

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The book "Rev's for OX's", by Leslie C. Miller, covers maintenance and re-building of OX motors conclusively. Price $1.00.

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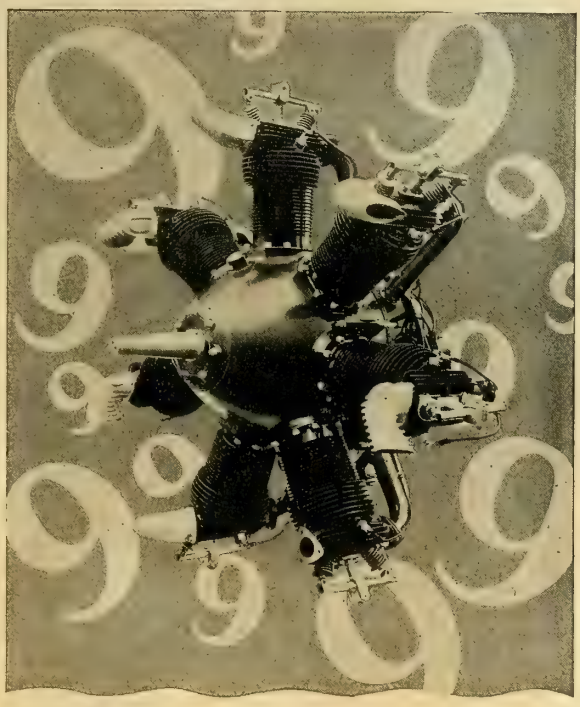
Floyd J. Logan Airplane Co., 716 West Superior, Cleveland, Ohio

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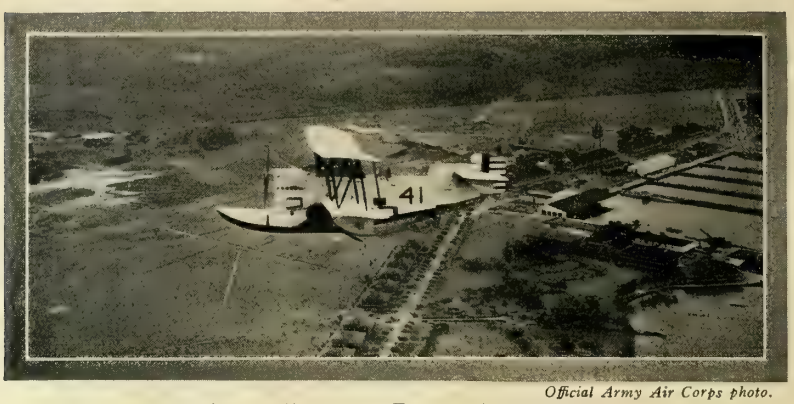
THE COMET Aviation Engine is an interesting study in simplification. There is nothing "novel" or experimental about it. Each of its outstanding features is based upon an engineering principle which has demonstrated its value in other internal combustion engines.

Fewer working parts and more power for the weight have been the objectives of *The Comet* engineers rather than the pursuit of new theories ... and the soundness of that plan is indicated by the record of *The Comet* on its official, government test and in the various ships in which it is being flown.

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NEWS OF THE AIR SERVICES



Official Army Air Corps photo.

Loening amphibian in flight over France Field, Panama Canal Zone.

SCHIFF TROPHY TO LT. JAMES E. DYER

THE Herbert Schiff Memorial Trophy has been awarded to Lieutenant James E. Dyer, Naval Aviator, who achieved a record of 1,251.15 hours in the air without accident to plane or personnel during the fiscal year 1927-28.

Lieutenant Dyer is now on duty with the Training Squadron 7, Naval Air Station, San Diego, Calif.

This is the last time that the trophy will be presented to an individual, for in the future it will be awarded to the squadron or unit which makes the best record for safety in flying during the fiscal year and the trophy will be presented to the commanding officer of the winning unit.

The Herbert Schiff Memorial Trophy was donated in 1925 for the purpose of promoting safety in flying by the family of Lieut. Herbert Schiff, U. S. Naval Reserve Force, New York, who was killed in line of duty at Hampton Roads, Va., on July 11, 1924.

The trophy was presented for the first time in 1925 and was won by Lieut. Reginald Thomas, U. S. Naval Reserve Force, of Squantum, Mass., who had a record of 583 hours 43 minutes. In 1926 it was won by Capt. Harold C. Campbell, U. S. Marine Corps, with a record of 839 hours and in 1927 it was awarded to Lieut. Arthur Gavin, U. S. Navy, with a record of 865 hours in the air.

DOOLITTLE TO GATHER FOG FLYING DATA

"SMILING JIMMY" DOOLITTLE, 1st Lt., A. C., whose friendly disposition has won for him that cheerful appellation, has a new station as well as a new job. He has been assigned to Mitchel Field, N. Y., where, in addition to his regular duties, he will coöperate with officials of the Daniel Guggenheim Foundation for the Promotion of Aeronautics in their research work in connection with fog flying.

PHOTOGRAPHS TAKEN SEVEN MILES UP

CAPTAINS ST. CLAIR STREETT and A. W. Stevens, Army Air Corps fliers, took off recently from Wright Field, Dayton, on an aerial photographic mission.

The results obtained are portrayed on the frontispiece of this issue of AERO DIGEST. This photograph, taken at an altitude of 37,854 feet, covers an approximate area of 33 square miles.

D. F. C. AWARDS

DISTINGUISHED Flying Cross awards have been made by the War Department to the pilots and mechanics who participated in the Alaskan air expedition of 1920 which was a pioneer flight made to demonstrate the feasibility of transporting an air force great distances with a minimum of preparation. Those who will receive the award are: Capt. St. Clair Streett, A. C.; 1st Lt. C. C. Nutt, A. C.; 1st Lt. C. E. Crumrine, A. C.; Erik H. Nelson, formerly 1st Lt., A. C.; R. C. Kirkpatrick, formerly 1st. Lt., A. S.; J. D. Long, formerly Sgt., A. S., and Master Sgt. J. E. English, A. C.

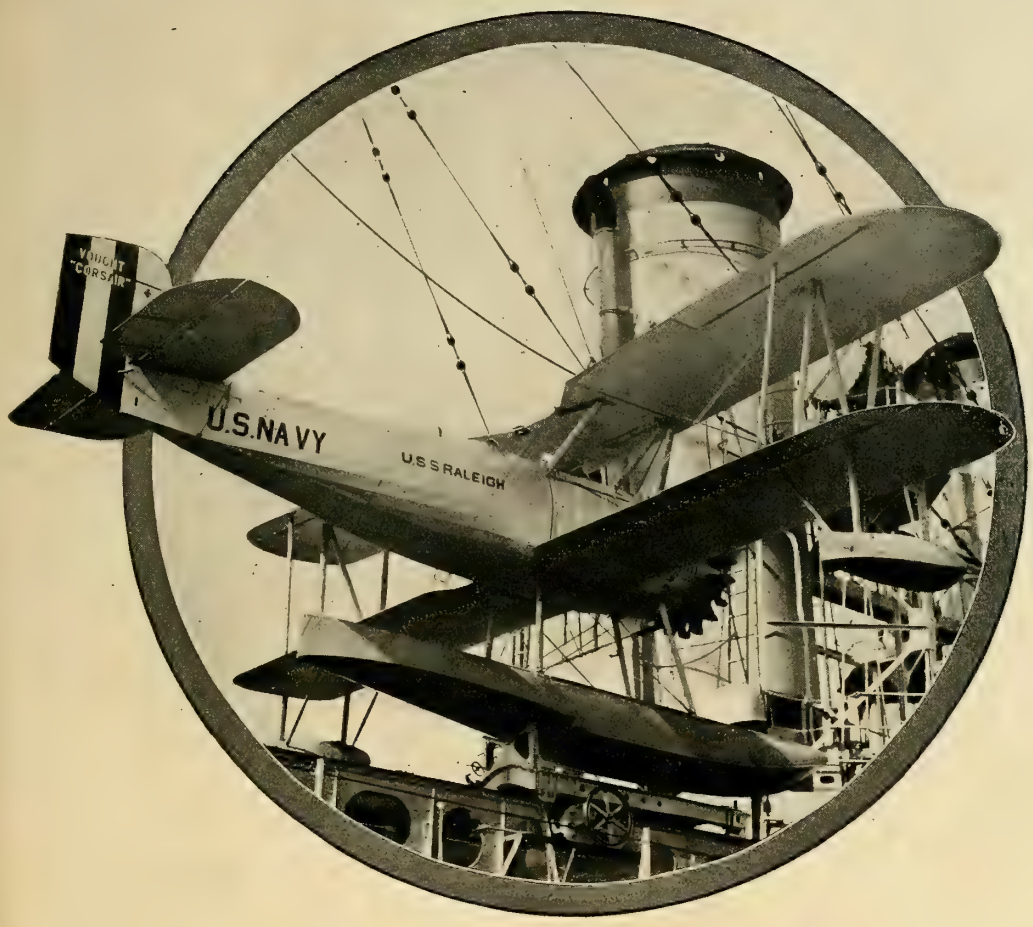
Mrs. Mary Gray, widow of Capt. Hawthorne C. Gray, A. C., received the Distinguished Flying Cross in recognition of the services of Capt. Gray, who lost his life when his oxygen supply failed on a balloon flight.

Lt. Uzal G. Ent, A. C., now stationed at Kelly Field, Texas, has been awarded the Distinguished Flying Cross for heroism while participating in the National Elimination Balloon Race as aide to Lt. Paul Evert on May 30 last.

The Distinguished Flying Cross has also been awarded to 2nd Lt. Arthur C. Goebel, A. C. R.



Camera and equipment used by Capts. Streett and A. W. Stevens in taking the photograph shown on the frontispiece, page 892.



Background

Airplanes that fly with their wings, and not with their engines alone, cannot be produced by a soulless group of desk engineers. Really flyable airplanes can be produced only by those who have had the closest contact with a wide range of flying and plane operations.

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THE AERONAUTICAL INDUSTRY

KEYSTONE & LOENING COMPANIES MERGE

ARRANGEMENT have been made for the merger of the Keystone Aircraft Corporation of Bristol, Pa., with the Loening Aeronautical Engineering Corporation of New York City, through the exchange of all the outstanding shares of the Loening Corporation for shares of the Keystone Aircraft Corporation.

The Keystone Aircraft Corporation, originally organized in 1920, has developed its business largely as a supplier of military planes to the United States Army and Navy and foreign governments, its present product consisting primarily of large bombing machines and training planes. The corporation is now completing the development of a large air transport, which will be its first commercial product.

The Loening Aeronautical Engineering Corporation was organized in 1917, and was among the first to build planes for commercial use and for private owners. Among the earlier types of Loening planes was the initial construction of the braced monoplane of the type that has since been very widely used. Of recent years the most notable achievement of this corporation has been the introduction, development, and marketing of amphibian airplanes, which are now entering into great popularity.

NEW COAST-TO-COAST RECORD SET BY COLLYER AND TUCKER

A NEW record for a non-stop flight from the Atlantic to the Pacific coast has been made. Captain C. B. D. Collyer, pilot, and Harry Tucker on October 25 completed the second East-West non-stop transcontinental flight in Tucker's Wasp-engined Lockheed-Vega, *Yankee Doodle*, in 24 hours, 51 minutes—1 hour 59 minutes less than the record established in 1923 by Army Lieuts. Macready and Kelly.

Collyer and Tucker took off with 525 gallons of gas from Roosevelt Field, L. I., N. Y., at 4:16:35 Eastern Standard Time, October 24, and landed at Mines Field, Los Angeles, Calif., October 25 at 2:08:30 Pacific time.

FIRST OUTSIDE LOOP BY COMMERCIAL PLANE

PILOTING a Sport Waco, Freddie Lund, test pilot for the Advance Aircraft Company, performed a perfect outside loop October 18th over the test field of the aviation company at Troy, Ohio, for the first time in the history of commercial aviation.

Lund started his loop at an altitude of 2,600 feet. Diving for speed he descended 1,800 feet, and then rolled over on his back at the bottom of the loop. Shoving the stick all the way forward he completed a perfect outside loop, and then rolled out of it into horizontal flight.

Successful accomplishment of the outside loop marks the first time in the history of aviation that a commercial pilot has achieved the feat.

The plane used is similar to the one which won the Class B transcontinental race from New York to Los Angeles in September. This plane was piloted to victory by John Livingston, Chicago distributor for the Advance Aircraft Company.

NEW AIRLINE ROUTES and SCHEDULES

THE following new airline schedules and changes in schedules have not been published before in AERO DIGEST. A complete list of mail, passenger and express airlines was printed in the December issue. New lines opened since that date or new schedules have been added in each succeeding issue.

Air Mail, Passengers, Express

NEW YORK CITY, ALBANY, N. Y.; MONTREAL, CANADA (opened October 1, 1928). Operated by Canadian Colonial Airways, Inc.

Time Table

Northbound (Read down)			*Southbound (Read up)*
7:00 a.m.	Lv.	New York	Ar. 10:00 a.m.
8:30 a.m.	Ar.	Albany	Lv. 8:30 a.m.
8:45 a.m.	Lv.	Albany	Ar. 4:50 p.m.
11:15 a.m.	Ar.	Montreal	Lv. 2:30 p.m.

Passenger Rates*

	New York	Albany	Montreal
New York	———	$25.00	$50.00
Albany	$25.00	———	35.00
Montreal	50.00	35.00	———

Reservations and Information

Montreal—Mount Royal Hotel.
Albany—Hotel Ten Eyck (Phone Maine 5308).
New York—270 Madison Ave. (Phone Ashland 7750).

* *Thirty pounds of baggage free; excess up to ten pounds at rate of 50c per pound.*

Air Mail

MEXICO CITY, QUERETARO, SAN LUIS POTOSI, SALTILLO, MONTERRAY, NUEVO LAREDO, MEXICO. (Opened October 1, 1928.) Operated by the Government of Mexico.

Time Table

Southbound (Read down)			*Northbound (Read up)*
8:30 a.m.	Lv.	Nuevo Laredo	Ar. 6:25 p.m.
10:25 a.m.		Monterray	4:40 p.m.
11:25 a.m.		Saltillo	3:45 p.m.
2:30 p.m.		San Luis Potosi	12:45 p.m.
4:20 p.m.		Queretaro	11:00 a.m.
5:40 p.m.	Ar.	Mexico City	Lv. 9:15 a.m.

Air Mail

C.A.M. 22—DALLAS, FORT WORTH, WACO, AUSTIN, SAN ANTONIO, LAREDO, TEXAS. (Extension to Laredo opened October 1, 1928.) Operated by Texas Air Transport, Inc.

Time Table*

Southbound (Read down)			*Northbound (Read up)*
7:45 a.m.	Lv.	Dallas	Ar. 7:37 p.m.
8:15 a.m.		Fort Worth	7:15 p.m.
9:20 a.m.		Waco	6:15 p.m.
10:25 a.m.		Austin	5:10 p.m.
11:15 a.m.		San Antonio	4:15 p.m.
12:55 a.m.	Ar.	Laredo	Lv. 2:35 p.m.

Postage Rates

United States—Mexico, twenty cents per ounce or fraction thereof.

* *Planes connect at Dallas and Fort Worth with mail planes to the north and east.*

Air Mail

OAKLAND, SAN JOSE, CALIFORNIA. (A feeder line for C.A.M.—8, Seattle-Los Angeles. Opened October 15, 1928.) Operated by Pacific Air Transport.

Time Table

(Read down)			*(Read up)*
4:45 p.m.	Lv.	Oakland	Ar. 6:40 a.m.
5:10 p.m.	Ar.	San Jose	Lv. 6:15 a.m.

Passengers

CHICAGO, ILL.; MADISON, WIS. (Opened July 19, 1928.) Operated by Royal Airways Corporation.

Time Table

Northbound (Read down)			*Southbound (Read up)*
5:00 p.m.	Lv.	Chicago	Ar. 9:45 a.m.
7:00 p.m.	Ar.	Madison	Lv. 7:45 a.m.

Passenger Rates

Chicago—Madison: $15 one way, $25 round trip.

Reservations and Information

Chicago—Phone: Randolph 3709.
Madison—116 E. Washington Ave.; phone: Badger 4110.

Passengers

CHICAGO, ILL.; MADISON, WIS.; MINNEAPOLIS, ST. PAUL, DULUTH, ALEXANDRIA, MINNESOTA; WAHPETON, FARGO, N. D.; AND CLEVELAND, OHIO. (Operated by Universal Air Line System.)

Time Table

Minneapolis, St. Paul—Chicago (Opened August 1, 1928)

Southbound (Read down)			*Northbound (Read up)*
10:30 a.m.	Lv.	Minneapolis	Ar. 3:15 p.m.
10:40 a.m.		St. Paul	3:05 p.m.
1:00 p.m.		Madison	12:15 p.m.
2:30 p.m.	Ar.	Chicago	Lv. 10:45 a.m.

Chicago—Cleveland (Opened September 15, 1928)

Eastbound (Read down)			*Westbound (Read up)*
8:00 a.m.	4:20 p.m. Lv.	Chicago (C.S.T.)	Ar. 8:35 a.m. 6:15 p.m.
11:45 a.m.	8:05 p.m. Ar.	Cleveland (E.S.T.)	Lv. 6:05 a.m. 4:30 p.m.

Minneapolis—Fargo (Opened August 1, 1928)

Northbound (Read down)			*Southbound (Read up)*
8:30 am.	Lv.	Minneapolis	Ar. 4:30 p.m.
10:00 a.m.		Alexandria	3:00 p.m.
10:40 a.m.		Wahpeton	2:30 p.m.
11:15 a.m.	Ar.	Fargo	Lv. 2:00 p.m.

Minneapolis—Duluth

Northbound (Read down)			*Southbound (Read up)*
8:30 a.m.	Lv.	Minneapolis	Ar. 5:15 p.m.
10:15 a.m.	Ar.	Duluth	Lv. 3:30 p.m.

Passenger Rates

Chicago—Cleveland, $45 one way; $85 round trip.
Minneapolis—Chicago, $40 one way; $75 round trip.
Minneapolis—Fargo, $25 one way; $45 round trip.
Minneapolis—Duluth, $16.50 one way; $30 round trip.

Reservations and Information

Duluth—300 Lonsdale Bldg. (Phone: Melrose 1529).
Fargo—Chamber of Commerce (Phone: 4500).
Wahpeton—Chamber of Commerce.
Alexandria—Chamber of Commerce (Phone: 10).
Madison—Mueller Travel Agency (Phone: Fairchield 433).
Chicago—228 N. La Salle St. (Phone: Randolph 2585).
Cleveland—Cleveland Hotel and Cleveland Airport.

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INDUSTRIAL LEADERS TAKE OVER CONTROL OF FOKKER ORGANIZATION

FINANCIAL interests from all sections of the United States have subscribed $4,000,000 to the stock of the Fokker Aircraft Corporation of America, which company has been reorganized with a view to immediately offering the aircraft market airplanes of all types from the individual sport model to the most costly military equipment. In the reorganization Anthony H. F. Fokker relinquishes control to a group of industrial leaders whose recent operations distinguished the air transport field.

James A. Talbot, president of the Richfield Oil Company of California, becomes chairman of the board, and Harris M. Hanshue, president and general manager of Western Air Express, becomes president and general manager of the manufacturing concern. Harland B. Tibbetts, New York attorney, becomes vice president. Others on the directorate include John A. Love, St. Louis banker; W. P. Wilson, of Wheeling, W. Va.; T. T. C. Gregory, San Francisco corporation attorney; L. H. Piper, of Minneapolis, president of Universal Air Lines, operating several routes in the mid-continent territory and identified with varied interests in the Great Lakes region; G. I. Lewis, New York attorney, and J. B. Brooks Parker, an insurance broker of Philadelphia. H. A. Reid of Los Angeles is secretary-treasurer.

While the stock will be listed for the purpose of establishing the market value, there will be no public offering of the issue, the entire amount having been privately subscribed in advance of the organization.

In announcing the reorganization of the Fokker Aircraft Corporation, Mr. Talbot pointed out the recent trend toward grouping of aeronautical enterprises. The reorganized Fokker company brings together two of the outstanding figures in the aeronautical world, he said. While there has been no exchange of stock between the Western Air Express and the Fokker company, Mr. Hanshue will retain the presidency and management of both companies.

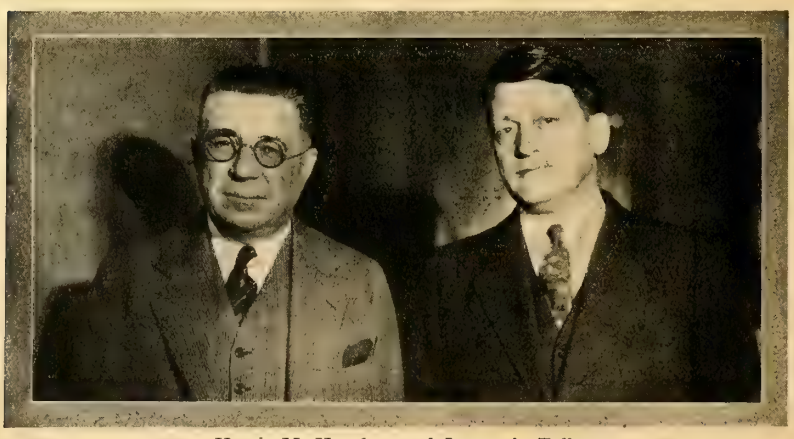
Up to the time the Western Air Express began operations, there had been no air transport operation in the world able to earn costs or to exist except for direct subsidies, although about four hundred attempts to establish such routes had been made. The Hanshue operation, financed by private subscriptions, proved economically successful from its first flight, showed earnings from its inception, and went on a regular dividend basis after fifteen months of building up reserves.

In Western Air Express no promotion stock was issued and no commissions were paid for the sale of stock, each share netting the treasury 100 cents on the dollar. This same policy is to prevail in the Fokker financing. Under Mr. Hanshue's management of Fokker Aircraft, Mr. Fokker will retain a stock interest and will devote his entire time to designing and developing new types of aircraft. The burden of directing, production and sales effort will be assumed by Mr. Hanshue, leaving Mr. Fokker free to exercise his genius as a practical aeronautical engineer.

The attraction of new capital to the Fokker organization and the placing of Mr. Hanshue in control of the management mean an immediate expansion in production. The two present plants of the company, at Hasbrouck Heights, N. J., and Wheeling, W. Va., will be enlarged and remodeled to increase production of aircraft types best suited to their capacities. In addition to this, within the next sixty days, the construction of a third plant in California will be undertaken. This new plant will incorporate the best production practices and will be equipped to produce any of the numerous types of ships from the sport model through the range of commercial craft. A nation-wide sales organization will be developed to make Fokker products readily available and to render users of Fokker equipment every facility of service.



Chance Vought William Boeing F. B. Rentschler



Harris M. Hanshue and James A. Talbot.

BOEING TRANSPORT CO.'S EXPANSION PLANS

AN investment of between $5,000,000 and $10,000,000 in the Boeing Airplane and Transport Company has been made by the National City Company of New York, in association with the Pacific National Company of Seattle, one of the largest investment organizations on the Pacific Coast. This is understood to herald the formation of a nation-wide transcontinental airplane service between New York and San Francisco, using trimotored twelve-passenger Boeing planes.

The Boeing Airplane and Transport Company is a new concern which will control through stock ownership the Boeing Airplane Company and the Transport Company of the same name. The funds raised by the new financing will be used to enlarge the Boeing plant at Seattle and to expand the company's flying facilities.

The parent Boeing Company's airplane factory covers seven acres in Seattle. Through its transport subsidiary the company operates air mail and passenger routes between Chicago and San Francisco and through another subsidiary, the Pacific Air Transport, it holds the air mail contract on the route between Seattle and Los Angeles. The planes of the company fly about 5,000 miles a day.

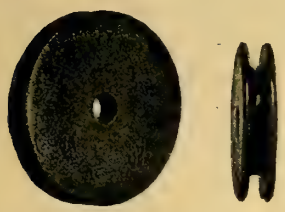
Directors of the new company will include K. R. Kingsbury, president of the Standard Oil Company of California; F. B. Rentschler, president of the Pratt and Whitney Aircraft Company; Chance Vought, president of the Chance Vought Airplane Corporation; J. P. Ripley, vice president of the National City Company; C. K. Knickerbocker, vice president of the Griffin Wheel Company of Chicago, and Mr. Boeing.

"The new capital," Mr. Boeing said, "is needed because of the rapidity of the growth of the Boeing airplane and transport business. The money is to be used in expansion of the plant and flying activities. The new company will increase the present service on the transport line between Chicago and San Francisco."



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.... and AVIATION PROGRESS



Micarta Pulleys

DURING the World War when a need developed for a dependable airplane propeller, Westinghouse responded to the need with a propeller made of Micarta. Even the first Micarta propellers had many advantages over the ordinary type. Since the War, however, Micarta propellers have kept pace with the progress of the aviation industry, and now Westinghouse offers to aircraft manufacturers one of the lightest, strongest, and most highly efficient propellers on the market.

Micarta propellers have participated in many of the history-making flights. The Fokker monoplane that first crossed the Pacific to Hawaii; the Breese monoplane that finished second in the Dole Derby; the Southern Cross, the Fokker monoplane that completed the longest oversea flight in history .... these and other famous planes were equipped with Micarta propellers.

But the use of Micarta in aviation is not restricted to propellers. Such accessories as control-wire pulleys and fair leads; aileron, elevator, and rudder hinges; as well as tail wheels are being made of Micarta.

Other Westinghouse Equipment for Aviation

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1st INTERNATIONAL AERON. EXPOSITION

THE first aircraft exposition given over solely and entirely to the manufacturers of commercial airplanes and accessories will be held in Chicago, December 1 to 9. It will be the First International Aeronautical Exposition, the first aircraft show directly sponsored and directed by the Aeronautical Chamber of Commerce.

The Aeronautical Chamber has leased the Coliseum and the First Regiment Armory, Chicago's largest exhibition halls. A canopied walk affords entrance from one building to the other, making the exposition practically under one roof. Though these two building contain more than 100,000 square feet, requests of manufacturers of aircraft and accessories have reached the Chamber in such number that it is questionable if they will be sufficient in size to house the displays of all those who have made application.

The available space has been allotted so that airplanes will be shown exclusively in the Main, North and South Halls of the Coliseum and in the Armory. Accessory exhibits will be placed in the Coliseum Grand Ball Room and in the balcony.

The Chicago Municipal Airport will be available at all hours to those manufacturers wishing to keep planes in readiness for actual demonstrations. Those who will fly ships which will be put on exhibition will find cartage facilities ready at a minimum cost.

Chicago's official help has been assured by the active part the Mayor's Aero Commission and the Aviation Committee of the Association of Commerce are taking in the plans.

In addition to the invitation extended by the Chamber to foreign exhibitors, the international flavor of the Chicago show will manifest itself in the presence of the more than 200 delegates from possibly forty-nine different nations who will be in this country to attend the International Conference on Civil Aeronautics which President Coolidge has called for Washington, December 12, 13 and 14.

The foreign delegates, on arrival in Chicago, will be honored guests of the city. Their entertainment, including an international banquet, will be in charge of a committee appointed by Colonel Paul Henderson, representing jointly the Chamber of which he is vice president for the Great Lakes Division, the Executive Committee of the Air Conference, and the Aero Commission of which he is chairman. This committee includes: Major G. Landis, secretary of the Aero Commission; Elmer Stevens, head of George A. Stevens & Brother; George B. Foster, Commonwealth Edison Company and vice president of the Association of Commerce; Earle B. Reynolds, president of Peoples Trust and Savings Bank, and George Getz, capitalist.

The American Society of Mechanical Engineers, Aeronautics Division, will be in session at the time, and its meetings will be open to the delegates. Since many of them are engineers, it will give a splendid opportunity for an exchange of old and new world engineering knowledge as it pertains to aviation.

One evening of the exposition will be given in part to a "trade dinner". It is planned to set aside one night on which to honor the old time pilots, those men who flew the planes of pre-war days and those who maneuvered the combat, bombing and other ships during war time. Those in charge of this affair want to hear from all the "old timers" who will or can be in Chicago during the exposition. Those interested should get in touch with Reed Landis at 26 East Huron Street, Chicago, Illinois.

The official Lindbergh Film, made from the "shots" taken on the flights to the various countries of Europe, Central and South America, will be shown to the public for the first time. Its premier was delayed until the show period in order that those visiting the Chamber's first aircraft display might be the original ones to view it.

INTERNATIONAL CIVIL AERON. CONFERENCE

NOTABLES in the world of aeronautics will assemble in Washington for the first International Civil Aeronautics Conference, December 12, 13 and 14. Fifty-four countries have been invited through the Department of State to participate.

The purpose of the international meeting, first suggested by President Coolidge as a fitting way to observe the twenty-fifth anniversary of the first flight of a power-driven craft by the Wright brothers, is to provide an interchange of views on problems relating to aircraft in commerce and trade.

No formal agreement is projected, but many of those experienced in commercial aeronautics feel that the concensus of opinion of the world's experts as to the best methods will naturally indicate a general trend which can be followed or rejected, as the various countries desire.

The countries invited are:

Albania, Argentina, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czechoslovakia, Denmark, Dominican Republic, Ecuador, Egypt, Esthonia, Finland, France, Germany, Great Britain and the British Dominions, Greece, Guatemala, Haiti, Honduras, Hungary, Irish Free State, Italy, Japan, Latvia, Lithuania, Luxemburg, Mexico, Netherlands, Nicaragua, Norway, Panama, Paraguay, Persia, Peru, Poland, Portugal, Roumania, Salvador, Kingdom of the Serbs, Croats and Slovenes, Siam, Spain, Sweden, Switzerland, Turkey, Uruguay, Venezuela.

The executive committee of the conference is as follows:

William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, Chairman; Francis White, Assistant Secretary of State; Trubee Davison, Assistant Secretary of War for Aeronautics; Edward P. Warner, Assistant Secretary of the Navy for Aeronautics; W. Irving Glover, Second Assistant Postmaster General; Col. Paul Henderson, vice president, Aeronautical Chamber of Commerce; Dr. G. M. Lewis, director, National Advisory Committee for Aeronautics; Capt. E. S. Land, Guggenheim Fund for the Promotion of Aeronautics; Senator Hiram Bingham, president, National Aeronautic Association; A. T. Stewart, U. S. Chamber of Commerce; Leighton W. Rogers, executive officer. Osborn S. Watson is assistant executive officer.

Other committees which are now arranging for the conference are:

Program—Starr Truscott, National Advisory Committee for Aeronautics, Chairman; James C. Dunn, Department of State; Maj. Ira Longanecker, War Department; Lieut. Comdr. George F. Chapline, Navy Department; Maj Clarence Young, Department of Commerce; George P. Tidmarsh, Aeronautical Chamber of Commerce.

Finance—Harry Guggenheim, Guggenheim Fund for Promotion of Aeronautics, Chairman; William McNeir, Department of State; E. P. Howard, Department of Commerce.

Entertainment and Transportation—Major Clarence Young, Department of Commerce, Chairman; J. C. Dunn, Department of State; Captain E. E. Adler, War Department; Lt. Com. D. C. Watson, Navy Department; J. F. Victory, National Advisory Committee for Aeronautics; A. T. Stewart, U. S. Chamber of Commerce; Daniel Shaeffer, Aeronautical Chamber of Commerce; Henry Berliner, National Aeronautic Association.

Printing—Hon. W. Irving Glover, Post Office Department, Chairman; Harry H. Blee, Department of Commerce; A. T. Stewart, U. S. Chamber of Commerce.

Banquet and Luncheons—Lt. Com. W K. Harrill, Navy Department, Chairman Myron Hofer, Department of State; Edward P. Howard, Department of Commerce William B. Mayo, Aeronautical Chamber of Commerce; Temple Joyce, National Aeronautic Association.

Publicity—Chance Vought, Aeronautical Chamber of Commerce, Chairman; Robert Scotten, Department of State; Maj. Ernest Jones, Department of Commerce; Hon. Robert S. Regar, Post Office Department; Capt. E. S. Land, Guggenheim Fund for Promotion of Aeronautics; Ben Lambe, U. S. Chamber of Commerce; Paul Wooten, Conference of Business Paper Editors.

Escort and Reception—Lieut. Com. R. H. Williams, General Staff, War Department, Chairman; James C. Dunn, Department of State; Lt. Com. W. K. Harrill, Navy Department; H. H. Blee, Department of Commerce; Major Donald A. Davison, District Commissioners.

Credentials—Sydney Y. Smith, Department of State, Chairman; E. P. Howard, Department of Commerce; Harold F. Pitcairn, Aeronautical Chamber of Commerce; Starr Truscott, National Advisory Committee for Aeronautics.

Hotel Reservations—D. A. Skinner, U. S. Chamber of Commerce, Chairman; Harry H. Blee, Department of Commerce.

As now outlined, the program calls for three general sessions, one on each morning of the Conference, and three separate afternoon sessions each day. There will also be an evening session December 13.

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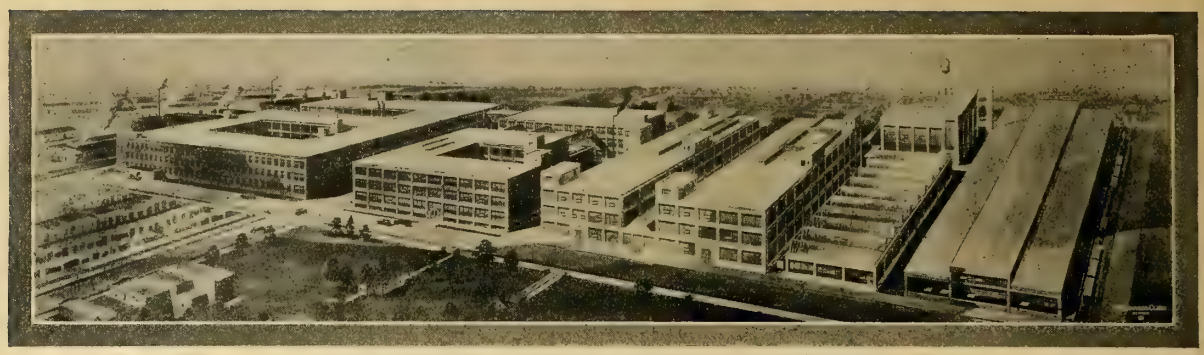
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Plant of the A C Spark Plug Company at Flint, Michigan.

MICHIGAN AIR NEWS

Twentieth Anniversary of AC Company

DURING the latter part of September, the AC Spark Plug Company celebrated the twentieth anniversary of its establishment in Flint. Organized in Boston in 1903, the company removed to Flint and began operations there September 23, 1908. At that time the late Albert Champion, founder of the AC company, and his associate, Basil W. de Guichard, now president and general manager, formed an association with William C. Durant and started making spark plugs with 15 employees.

During the course of two decades, the original 15 employees have increased to 4,000, the one product, spark plugs, has been augmented by ten others, and the small corner of a Buick building which was first used as a factory has been replaced by buildings the floor space of which amounts to more than sixteen acres. Initial production of spark plugs of a few hundred a day has developed into a daily capacity of 200,000 and the output of other AC products totals more than 62,000 units a day. This expansion of the AC company has not been confined alone to one locality, for the company now operates plants in Paris, France, and Birmingham, England.

Besides this material expansion, the company has contributed much to the development of reliable spark plugs for automobile and airplane engines through its research department. Organized at an early date, this department today is composed of some of the industry's most eminent engineers. Before the United States entered the World War, these engineers had developed an efficient spark plug for airplanes. Consequently, with the sudden demand for great quantities of plugs for wartime airplanes, the company was able almost immediately to go into production. By the time hostilities ceased, AC was turning out more than 50,000 aircraft spark plugs per day. Wright, Liberty, Hispano-Suiza, and several foreign engines built in Allied countries were being equipped with these plugs.

Since the war the AC company has continued to produce airplane spark plugs, and its research department is still studying the development of such plugs. As an example of the part played by research work,—the spark plugs used by Lindbergh were designed several years in advance of his epochal flight.

Other products of the company which are used on airplanes are gasoline strainers, thermo gauges, oil gauges, ammeters, tachometers, and instrument board panels.

BATTLE CREEK is beginning work on its program to improve the local airport, Kellog Field, given to the city by W. K. Kellog. By removing buildings, hedges and an orchard, 40 acres will be added to the present area. Improvements include an adequate lighting system, a fence around the field and a 100-foot circle in the center of the field. The farmhouse on the property is to be remodelled as a clubhouse and residence for the manager.

Air Congress at Menominee

THE Northern Michigan Air Congress was held October 12 and 13 at Menominee under joint auspices of the Menominee Chamber of Commerce and the Upper Peninsula Development Bureau. In conjunction with the congress, the city planned a public celebration and a two-day program at Menominee airport. In addition to a number of planes representing air transport companies, a squadron from the National Guard and several trimotored planes were exhibited and demonstrated at the airport.

The business of the congress centered around the further development of airports and transport lines in the upper peninsula of Michigan. Air transportation offers the most practicable means for overcoming the natural barriers which now isolate that part of the state from both the lower part of Michigan and the Middle West.

The county of Menominee has already begun work toward that end. Last April the county board of supervisors appropriated $20,000 for the construction of an airport. This appropriation has given the county a 150-acre flying field, artificially drained, with concrete runways.

ANN ARBOR officially dedicated its airport October 9. This airport is situated four miles south of the city. Two long runways are provided on grass-grown, peatloam soil. A hangar was recently added to the equipment at the airport.

The commercial rights to the airport are in charge of the Flo Flying Service, Inc. Leonard S. Flo, president, will manage the airport and maintain a competent staff to service all incoming planes. A course of instruction will be conducted at the airport.

DETROIT AIR NEWS

By Frank Bogart

THE Aircraft Bureau of the Detroit Board of Commerce has been reorganized for the coming year and is under the chairmanship of Edward S. Evans, with Ray Cooper as salaried manager of the three major events sponsored each year—the All-American Aircraft Show, the National Air Tour for the Edsel Ford reliability trophy, and the Gordon Bennett International Balloon Race.

The week of April 6-13, 1929, has already been fixed for the second annual All-American show. The bureau's executive committee contains four of Detroit's leading bankers as well as all of the leading aviation supporters. A strong supporting list of ten additional committees has been named as follows:.

Executive Committee—E. S. Evans, chairman; Frank W. Blair, William B. Mayo, William E. Metzger, vice chairmen; Harvey Campbell, secretary; Charles B. Bohn, Charles T. Bush, Norman B. Conger, D. Dwight Douglas, Griffith Ogden Ellis, Harold H. Emmons, Harry R. Graham, Eugene W. Lewis, W. J. McAneeny, Thomas S. Merrill, Phelps Newberry, William E. Scripps, Col. Sidney D. Waldon and Capt. L. M. Woolson.

National Air Tour—William B. Mayo, chairman; Eugene W. Lewis, vice chairman; Thomas B. Colby, Norman B. Conger, William F. V. Newmann, Warren Packard and Newton Skillman.

All-American Aircraft Show—Edward S. Evans, chairman; William E. Metzger, vice chairman; Harry R. Graham, W. Magruder Jones, William B. Mayo, William E. Scripps and Capt. L. M. Woolson.

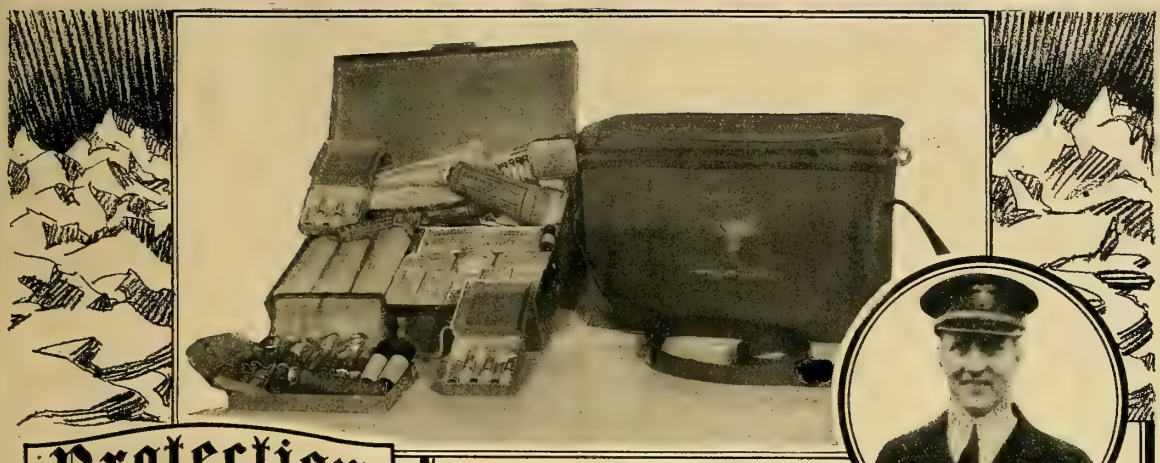
Finance Committee—Frank W. Blair, chairman; Charles T. Bush and Col. Sidney D. Waldon.

Public Relations—William E. Scripps, chairman; Austin F. Bement, James M. Evans, G. A. Richards and George Willins.

Legislative Committee—Harold H. Emmons, chairman; Sid A. Erwin, vice chairman; Frank Eaman, Capt. Arlo A. Emory and John A. Lovett.

Entertainment Committee—Phelps Newberry, chairman; W. J. McAneeny, vice chairman; Walter O. Briggs, Roy D. Chapin, D. Dwight Douglas, Col. Sidney D. Waldon and William Robert Willson.

(*Continued on next page*)



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Gentlemen:

The 'Tabloid' Medicine Cases for the airplanes and the medical supplies for the expedition which you were commissioned to furnish as the official medical equipment for the Antarctic Expedition have been received.

Our medical officers have assured me that the needs of the expedition have been more than adequately anticipated. I have personally examined the medical supplies with a great deal of satisfaction.

The 'Tabloid' First-Aid and Medical Equipments which are to serve as the medical units for the airplanes of the expedition have received my special attention. As always these medical outfits are the last word in compactness and portability.

I carried 'Tabloid' Medical Equipments on the exploration flight in the Arctic, over the North Pole and also on my Trans-Atlantic Flight. In each instance the medical equipment has served with great efficiency and I consider it indispensable in exploration work. From personal experience I know that your medicinal preparations absolutely live up to their established universal reputation for exceptional purity, accuracy and reliability, and possess unusual keeping qualities.

Sincerely yours,

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R. E. Byrd/4

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(Detroit Air News continued)

Industrial and Airport Committee—Eugene W. Lewis, chairman; John R. Reynolds, vice chairman; Charles B. Bohn, Judson Bradway, Sid A. Erwin, Edward E. Kramp and Capt. Harrington Place.

Technical Committee—Capt. L. M. Woolson, chairman; William B. Stout, vice chairman; Thomas B. Colby, Harry R. Graham and Dean R. E. Lawrence, University of Detroit.

Special Events Committee—Charles T. Bush, chairman; Hon. Henry S. Hulbert, vice chairman; Carl H. Keller, D. C. Pennington and J. Ferrand Williams.

Model Airplane and Glider Committee—Griffith Ogden Ellis, chairman; D. F. Walker, vice chairman; William B. Stout.

AFTER once approving a $5,000,000 bond issue for enlarging and equipping the Detroit city airport, and then ordering the proposal removed from the November 6 ballot, the city council has reversed its decision again and allowed the bond issue to be presented to the voters, who are reasonably sure to pass it. The city airport is at Lynch and French roads, in the east side industrial district, but is only twenty minutes from downtown, whereas the new and larger county airport is 16 miles out on the west side. No plans for its development have yet been framed. It is a mile square site.

Plans for a $1,000,000 administration building for the city airport are based on the promise that the building would also serve as an aeronautical exhibition hall.

GLIDERS, INC., has recently been established in Detroit for the manufacture and sale of gliders, soarers and light aircraft.

The directors of the new corporation include: Eddie Stinson, Stinson Aircraft Corp.; William J. Scripps, The Detroit *News;* Captain E. V. Rickenbacker, Cadillac Motor Company; Everette W. Sawyer, broker; Alfred Verville, aircraft engineer; William B. Stout, Stout Air Service; Mark Kearney, Griswold First-State Company; Tom Towle, Towle Marine Aircraft Corporation; Stanley Knauss, Stout Air Service; Forrest A. Heath, Michigan Mutual Liability Company.

The officers are: William J. Scripps, president; Mark A. Kearney, vice president; Everette W. Sawyer, treasurer; Forrest A. Heath, secretary.

The first machine, a training glider of conventional type to be known as the P T 1 (Primary Training 1), is now being manufactured.

THE Albatross club, made up of eight young men who are employed by the Aircraft Development Corporation of Grosse Ile, was organized and immediately affiliated as Club No. 1 with the Evans Glider Clubs of America.

Members are: Wilbur C. Morrow, president; Earl Nellis, vice president; E. Morris Wright, secretary; Burchard W. Wilson, treasurer; and Thorvald Larsen, Roy Cunningham, Hugh Hoar and Hubert Fowser.

TRANSCONTINENTAL AIR TRANSPORT, INC., has ordered ten trimotored Ford planes to be used in the combined rail and air service which the Pennsylvania railroad and the air company will inaugurate early next spring between New York and the Pacific Coast. The Ford Company expects to deliver the entire order by February 1, 1929.

THE subject chosen for the Union Trust Company's sixth annual essay contest is "Aviation as a Business". The prizes offered for this contest, which is open to seniors in Wayne, Oakland, and Macomb county high schools, are five $1,000 scholarships for such college or university as the winners may choose.

A banquet, to be attended by the presidents of senior classes, editors of school publications, and English teachers, superintendents and principals of the various high schools, will mark the opening of the contest.

The fascination and interest which aviation holds for young persons today will undoubtedly render this the largest contest held thus far.

OHIO AIR NEWS

By T. E. Lunsford

THE Tri-Motor Airways Transit Co. has been formed at Columbus. The president of the new company is Harold Luethi of Columbus; Frank Forsythe, secretary of the Civil Service Commission of Ohio, is secretary; Capt. O. M. Goodsell, Army Air Corps, is vice president, and George Myers, Port Clinton banker, is treasurer.

H. E. BARBER, vice president and general manager of the Universal Air Lines, Inc., has announced that daily air passenger service between Columbus and Dallas, Texas, will be started January 1. The service will include Memphis, Nashville and Little Rock and probably Louisville and Cincinnati.

LANSDOWNE FIELD, Greenville's new municipal airport, was dedicated September 23. The field, named in honor of Lt. Com. Zachary Lansdowne, Greenville's native son, was provided by popular subscription. It is located one and a half miles from Greenville and contains approximately 100 acres.

THE Columbus Aircraft Corp., which has successfully tested a new monoplane to be manufactured there, has been incorporated by A. J. Frame, G. Edwin Smith and D. N. Postlewaite, all of Columbus. The plane, a four-passenger cabin type with a Ryan-Siemens radial motor, was designed by Frame with the assistance of U. S. Army Air Corps engineers.

UNANIMOUS approval of the proposed municipal airport was given by the Columbus Council of Civic Associations, following a report and recommendation of its aviation committee, headed by C. E. Workman. Practically every civic organization in Columbus is represented in the Columbus council. The City Council recently passed a resolution submitting the airport proposition to a vote of the people at the November election.

SIX floodlights for night flying, together with a rotating air beacon, have been erected along the north border of Norton Field at Columbus.

EIGHT airplanes were destroyed by fire at the Dayton airport, Vandalia, October 11. The fire caused a damage estimated at approximately $35,000. Four of the planes were the property of the Johnson Flying Service, which maintains its headquarters at the recently constructed airport. The other ships belonged to private owners who had their ships stored in the hangar.

THE Troy Club entertained the four Waco pilots, John Livingston, John Wood, Charles Meyers and Stanley Auer, who participated in the class B transcontinental race, their mechanics and the officials of the Advance Aircraft Co., at an informal smoker at the club room October 10. They piloted the four Waco planes in the race which was won by Livingston, with Wood finishing third and Meyers fifth.

THE Alliance Aircraft Corporation has purchased a 141-acre tract of land to be used as a factory site and proving grounds for the new "Argo" planes and "Hess-Warrior" motors. The first of a series of factory buildings is of steel and concrete construction, 300 feet long and 60 feet wide, single span. It will be ready for occupancy about December first. Meanwhile, general operations are being carried on in the plant of the Morgan Engineering Company. The site is one and three-quarters miles from the Alliance Post Office.

SPRINGFIELD now has a first class airport, located 4½ miles southeast of Springfield at the intersection of the Big Four Railroad and the Charleston Pike. There are approximately 100 acres of level ground in the field. Runways are in the shape of a T. The east and west runway is approximately 2,500 feet, and the north and south runway approximately 2,600 feet. A government air mail beacon with lighted wind sock has been installed on the northwest corner of the field. A modern steel hangar, 60′ x 60′, has been erected, as has an administration building which is equipped with radio receiving apparatus, telephone, barometer, thermometer, and weather bureau reports.

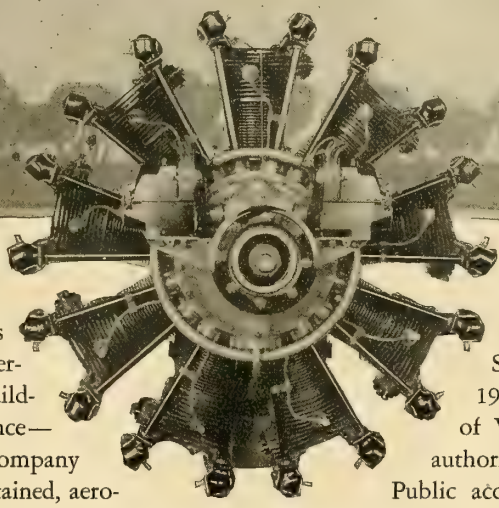
Aviation gasoline, oil, and water are available, also transportation to the city if desired. Meals for visiting fliers can be obtained at the field.

The airport is operated by the Little-Greiner Flying Service, Inc., with C. F. Greiner as president, W. B. Little, vice president, and E. E. Greiner, secretary and treasurer.

WRIGHT in 1903



The airplane in which Orville Wright, on December 17, 1903, made the first successful, sustained flight in a heavier-than-air machine at Kitty Hawk, North Carolina, was powered with a Wright Engine.



IN the three fundamentals—experimental engineering, experience in engine building, and proved performance—Wright gained, and the company which they founded has retained, aeronautical engine leadership. The story of Wright Engines is the story of aeronautical achievement. Each distinct advance from Kitty Hawk in 1903 to the outfitting of the latest South Polar expedition of 1929 has carried the sum total of Wright experience and the authority of its research.

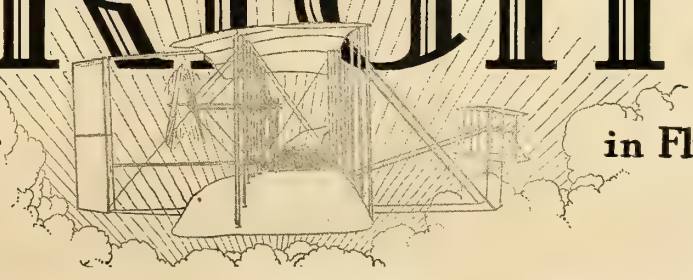
Public acceptance—public trust—has brought with it the responsibility of leadership—responsibility to plane manufacturer, to air line operator, to pilot, and to passenger.

WRIGHT AERONAUTICAL CORPORATION, *Paterson, N. J., U. S. A.*

CANADIAN WRIGHT LIMITED, Sole Licensees for Canada, Montreal

AUTHORIZED PARTS DEALERS: Air Associates, Inc., *Curtiss Field, Long Island, N. Y.* Pacific Aeromotive Corporation, *Los Angeles, Cal.* Stout Air Services, Inc., *Dearborn, Mich.*

WRIGHT

The First Name  **in Flying**

CLEVELAND AIR NEWS

By David E. Irwin

CLEVELAND is to have the 1929 air races.

To Clifford Gildersleeve, aviation secretary of the Cleveland Chamber of Commerce, and Floyd J. Logan goes the credit for bringing the most outstanding aviation event of the year to Cleveland.

Cleveland must raise between $200,000 and $250,000 to insure getting the races, but plans are already being drawn by Major John Berry, superintendent of Cleveland airport, for caring for the races, and little doubt is felt but that the money will be provided.

The airport facilities of Cleveland are said to have been one of the outstanding reasons for the selection of this city for the event.

UNIVERSAL AIR LINES SYSTEM, operator of the new Cleveland-Chicago passenger service, has opened up a stop at Toledo.

Both the plane arriving in Cleveland from Chicago at 11:45 a.m. daily, and the ship leaving Cleveland at 2:30 p.m. for Chicago, stop at Toledo, the former being due there at 10:45 a.m. and the latter at 3:20 p.m.

The fare between Cleveland and Toledo is $10 each way, while a one-way ticket from Toledo to Chicago is $35 and a round trip, $65.

The Cleveland-Chicago run, which has been open since September 15, is carrying near capacity loads. Seven-passenger Hamilton all-metal planes are being flown.

A plane-train hook-up is being operated in conjunction with the New York Central railroad. Passengers leave New York in a sleeper, arrive in Cleveland at 6:05 a.m., and take a U.A.L. plane at 6:50, arriving in Chicago at 8:35, Central Time.

Leaving Chicago, passengers can take the U.A.L. plane east at 4 p.m., four hours after the Century of the New York Central, and catch the train in Cleveland at 9 p.m.

CLEVELAND now has air mail service to Mexico City, through a hook-up of the National Air Transport's New York-Cleveland-Chicago route and the new Chicago-Dallas night run.

Connections are made at Fort Worth with the Texas Air Transport, Inc., which flies to San Antonio and to Laredo on the border. From Nuevo Laredo to Mexico City the Mexican government is now operating mail service.

THE Detroit and Cleveland Navigation Co., which operates boats between Cleveland and Detroit, has ordered two 25-passenger Dornier Superwal all-metal flying boats to be put into service between Detroit-Cleveland and Buffalo, according to Commodore A. A. Schantz, president of the company.

The company plans to begin regular service with the flying boats next June. The ships, made by the Dornier Metalbauten Co., of Friedrichshafen, Germany, have a top speed of 133 miles an hour and cruise at 100. They have a speed on the water of 45 miles, weigh 16,000 pounds and carry a load of 14,500 pounds. American-made engines are to be installed in them.

MAJOR JOHN BERRY, superintendent of Cleveland airport, has been presented with a ten by seven foot aviation map of the United States by the Austin Co., of Cleveland, hangar construction concern.

The map was made by the Rand McNally Co., of Chicago, and is marked with 100-mile circles around Cleveland.

UNITED AIRWAYS, a new corporation headed by J. C. Murray, president of the Nestle-LeMur Co., is to build a large hangar at the Cleveland airport. The company will conduct an airplane sales agency and taxi service.

The N. A. T. new hangar is nearing completion and should be ready for occupancy within a few weeks.

WILLIAM H. SPIRE of the Cleveland plant of Thompson Products, Inc., has been named director of engineering, and Richard E. Bissell has been made chief engineer for that company. Mr. Spire was formerly chief engineer, and Mr. Bissell was research engineer of the company. These promotions are in recognition of services rendered the company. Mr. Spire has been with Thompson Products, Inc., for twenty-one years, and Mr. Bissell, for ten years.

THE John S. King Company, Inc., advertising agency, now employs a Swallow biplane in the interests of its clients and for contact work. Ernest Dryer is piloting the plane for the King company. Several of the company's clients plan to use the plane to establish closer contact with their distribution organizations.

SCALE MODEL CONTEST WINNER TELLS OF TRIP TO WEST COAST

WILLIAM LOFTON DENNIS, winner of the scale model prize at the Airplane Model League Contest conducted by the *American Boy* magazine, tells the story of his trip to the West Coast, (which was given to him by AERO DIGEST as a prize for winning this contest), in a letter to Frank A. Tichenor:



William Lofton Dennis

"Dear Mr. Tichenor:

Well, it's all over and I can hardly realize now that I am home and have registered at school that I have been to California with you and Frank, Jr., and have seen so many marvelous sights, met so many important people while I was there and enjoyed every single minute. I can only say I envy the 1929 *winner of the* AERO DIGEST *prize.*

To think that I actually talked to General James E. Fechet, Chief of the Air Corps. Harry Tucker, Art Goebel, and Congressman W. Frank James. I shall never forget the flight to San Diego in the three-motored transport, the "Sea Hawks" and the "Three Musketeers", and that I stood alongside of Colonel Lindbergh and the many places we visited—Chicago, Albuquerque (say weren't those Indians funny at the station), Pasadena, San Bernardino, Santa Monica, the swimming pool at the Ambassador, the moving picture studios, the actors and yes, even the actresses, and then on our way back, the Grand Canyon and the Hawaiian Rifle Team.

Honestly I had a wonderful time—it was a great trip—and one that I will always remember and I thank you and The American Boy sincerely.

Sincerely,
William Lofton Dennis"

BALTIMORE AIR NEWS

By Edward Johns

LOGAN FIELD will become an air mail stop on a mail route serving Washington, Baltimore, Pittsburgh and the Middle West, Mayor William F. Broening has been notified. The route will begin operations in March, 1929, it was said. At present air mail originating in Baltimore is sent to Washington when it is bound south and to Hadley Field, New Brunswick, N. J., when bound across the continent, or to the southwest or Montreal. No air mail planes now stop in Baltimore.

A SIXTEEN-PASSENGER Ford trimotored transport, belonging to the Trimotor Tours, Inc., hummed into Baltimore from Detroit and spent a week carrying passengers over the city. The pilot was Capt. Ogden M. Goodsell and the passengers were Charles H. Luethi, president of the company, Mrs. Luethi, Mrs. Goodsell and two children.

A THUNDERING display of ordnance was given by the Army Ordnance Association at the Aberdeen Proving Grounds, featuring anti-aircraft batteries and bombing, sky-fighting and strafing last month.

Maj. Gen. C. C. Williams, Chief of Ordnance, stated in an address that fire control has been extended to anti-aircraft batteries, and that an instrument that is practically automatic has been developed to give instantaneously the range at which an airplane is flying. The "robot" was on display but was not used in the demonstration.

In the Air — On the Land — On the Water

The

SIKORSKY

TWIN-MOTORED

AMPHIBION

No Forced Landings from Engine Trouble

Land WHEN and WHERE you WISH

HAS ALL THE ADVANTAGES!



This shows the Amphibion on the water's surface with the wheels drawn up beneath the lower wings, able to speed to the shore or to rise in still air, with a useful load of four thousand pounds, in sixteen seconds



Here are three S-38's, poised and ready for flight. Each Amphibion weighs six thousand pounds and each can take off from the ground in still air, with a two-ton useful load, after a ten-second run and then climb at the rate of 880 feet per minute.

¶ The Sikorsky Amphibion has a guaranteed ceiling of over 20,000 feet; a guaranteed speed of more than 125 miles per hour; and is guaranteed to fly on one engine, with a pilot, mechanic, nine passengers and gasoline for a five-hour flight. ¶ It has excellent maneuverability under all conditions, unusually quick take-off, fast climb and slow landing speed. ¶ In thoroughly tested methods of construction, excellence of materials and precision of workmanship, it is in the very front rank of airplane construction. The position of the motors, which are entirely separated from the cabin and the gas tanks, insures safety, visibility and comfort.

ILLUSTRATED LITERATURE ON REQUEST

SIKORSKY AVIATION CORPORATION

COLLEGE POINT, LONG ISLAND, NEW YORK

NEW YORK AIR NEWS

By M. E. Brasher

Roosevelt Field

FOR night landings, Ben Christianson, mechanic for Aerial Advertising, Inc., has devised a Neon-lighted wind indicator. It is four feet by six feet and, according to Eric Wood and Lt. H. B. (Buddy) Clarke who made landings in the semi-dark, it was clearly visible. Christianson plans to make a larger one to market to other fields.

AS a first step in the program to make Roosevelt Field one of the most up-to-date and best equipped airports in the East, M. Lombardi, of the Roosevelt Field Flying School, has stocked a store on the field with a complete line of equipment, including Irvin parachutes. Three of the parachutes were sold during the first week.

Lt. Henry B. Clarke, operations manager, announced that several new steel hangars are to be erected and that work will be started before long on the construction of three good runways which will cross each other and allow take-offs for long distance flights from any direction.

Curtiss Field

ALTHOUGH Col. Charles W. Kirkwood, formerly of the Lafayette Escadrille and now with the American and Oveaseas Air Transportation Co., has no definite announcement to make about what will be done with the large Sikorsky sesquiplane, *Ville de Paris*, piloted by Wilmer Stultz, it is rumored around Curtiss Field that it will soon be flown non-stop to the West Coast and return. Wilmer (Bill) Stultz has been giving the twin-motored ship a lot of exercise lately.

ALEXANDER PEDU, president of Air Transport Equipment, Inc., well known distributor of aircraft accessories and materials, has leased a large building at Curtiss Field which will be used as a warehouse and salesroom. It is conveniently located, and visiting pilots are cordially invited to stop in.

NEARLY all the bearings in the motors and machines of the *Graf Zeppelin* on its recent flight across the Atlantic were supplied by the SKF Industries' sister company in Germany. The five Maybach motors were equipped with SKF anti-friction bearings. SKF thrust bearings were used on both the radio and the light generators. Other machines, such as the heat generator, the spindle of the bow-anchor (which fastens to the mooring mast), measuring apparatus, and propeller shafts, were equipped with ball and roller bearings.

R. CLIFFORD DURANT, son of Durant, the automobile manufacturer of Detroit, recently bought an Avro Avian from Air Associates, Inc. Mr. Durant saw the Avian while in England and was so impressed by its performance that he ordered one almost immediately after his return from Europe. He intends to use this plane in maintaining business contacts as well as for private pleasure trips.

PRODUCTION of the Bristol Jupiter airplane motor probably will be started in the United States before the end of the year by the E. W. Bliss Company, which was recently given an exclusive license for the manufacture and sale of the engines in this country.

Two model motors from the plants of the Bristol Aeroplane Co., Ltd., England, have arrived in this country and will be given exhaustive tests by the United States Government preliminary to the beginning of manufacturing operations by the Bliss Company. Changes in the Bliss plants are being speeded up to permit production of the new motor on a large scale as soon as the tests are completed.

THE Curtiss Aeroplane and Motor Co. of Garden City. N. Y., has received an order from National Air Transport, Inc., for eight fast mail planes to be used on the Kansas City-Chicago run. The new planes, which have a top speed of 145 miles an hour, are specially-built Curtiss Falcons, having a mail capacity of 750 pounds, and carrying 135 gallons of fuel, sufficient for five hours' flying at a cruising speed of 120 miles an hour. They are being built at the Buffalo factory of the Curtiss Company.

JAMES H. COLLINS, until recently U. S. Department of Commerce Inspector of Aircraft, has joined the Curtiss Flying Service staff as pilot and instructor.

Collins received his flying training in the Army at Brooks and Kelly Fields where he was a classmate of Lindbergh, graduating from the pursuit school in 1925 with Lindbergh, Phil Love, and Lieutenant Stevens. He has had more than 1,600 hours in the air, and, because of his wide experience as a cross-country pilot, will serve in that capacity with the Curtiss Flying Service and will also assist in training students to receive Department of Commerce pilot's licenses.

PAN AMERICAN AIRWAYS took delivery early in October of their first Loening cabin amphibian. This is a single control job with Pratt and Whitney Wasp engine. Plane and engine are completely bonded and shielded for radio. The plane was flown to Miami by Lieutenant Callaway of the Navy, and immediately put into regular service.

ONE of the three airplanes that Commander Richard E. Byrd is taking on his Antarctic flight expedition, a General Airplane, is equipped with a standard Consolidated instrument panel A, which includes an altimeter, tachometer, oil pressure gauge, and oil thermometer.

Twenty-one aircraft manufacturers now use Consolidated instrument panel A as standard equipment on their planes.

The company recently contracted to supply the Gates-Day Aircraft Corp. with 100 type A instrument panels. These will be used as standard equipment on their new "Standard" plane. An order for 300 type A panels and air speed indicators has been received from R. O. Bone Co.

Dinner in Honor of Captain Emory S. Land

ONE of the most interesting gatherings of leaders in the aeronautical industry and those interested in its progress was held on September 28th at the Montauk Yacht Club, New York City. This dinner, given by Mr. Chance Vought and Mr. F. B. Rentschler, was in honor of Captain Emory S. Land, who is on a year's leave from his duties as Assistant Chief of the Bureau of Aeronautics, Navy Department, and who has joined the Guggenheim Fund for the Promotion of Aeronautics, to which he brings his wide experience in aeronautical matters to aid in the solution of the important problems which that organization is undertaking.

Having Captain Land in New York is a great pleasure to all of his friends, and the hosts of the occasion took that opportunity to express their appreciation and to do honor to his past accomplishments.

Gathered around the table were representatives of all branches of the industry, of the world of finance, men who fostered the industry in its infancy, leaders in the industrial affairs of the country, and some of the country's finest fliers. The representatives of our military air services included Captain Richardson and Commanders Towers and Shoemaker, of the Navy, and Colonel H. C. Pratt of the Army Air Corps.

MR. LEO M. FRANCIS, of Buffalo, N. Y., has been appointed dealer for Fairchild products in Buffalo and vicinity.

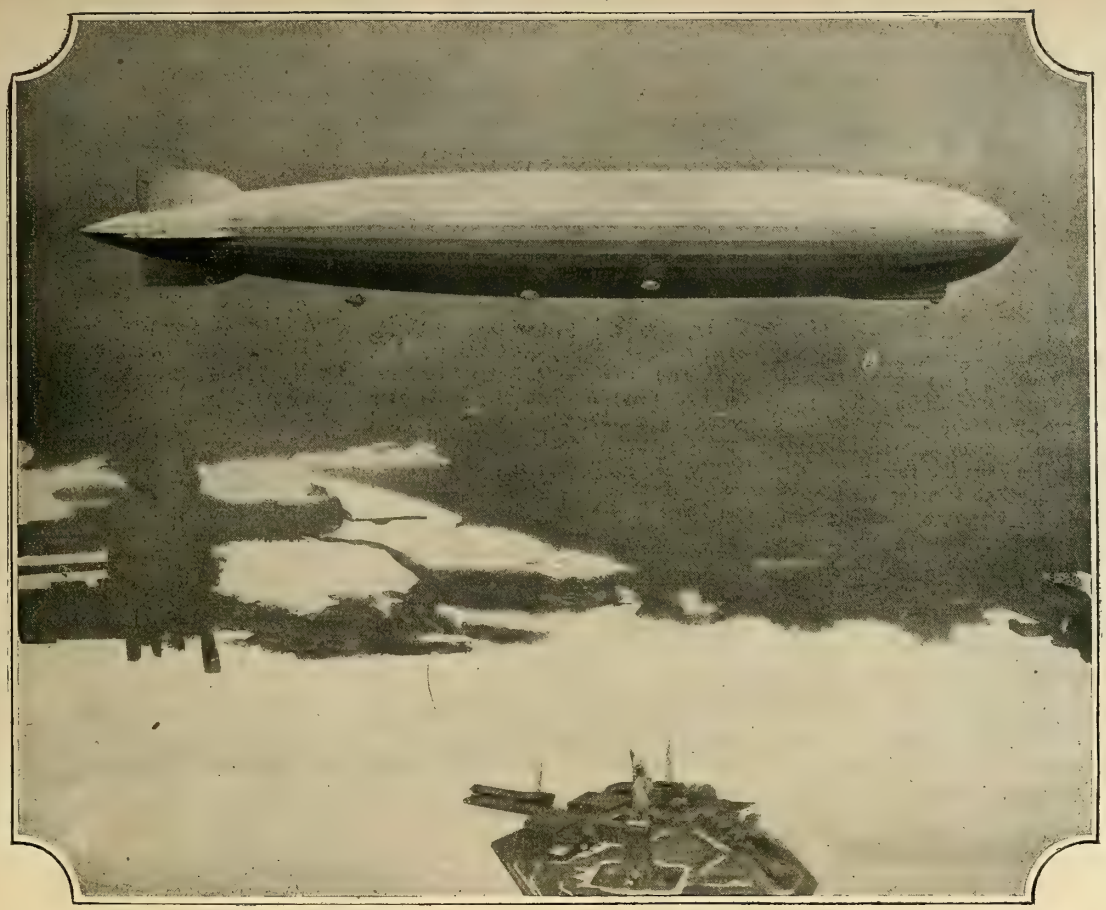
Aero Insurance Group Is Formed

THE Aero Indemnity Co., Inc., and the Aero Insurance Co., Inc., having a fire and marine insurance charter, have been formed. Both companies are owned by Aero Underwriters Corp. The lines of insurance written by the two companies include fire, accidental damage, tornado, theft, public liability, passenger liability, property damage, personal accident, compensation and cargo.

The latter company will act as manager of the two insurance companies, but the underwriting will be done through the agency of the aviation underwriters, Barber & Baldwin, Inc., of New York, in which agency the Aero Underwriters Corporation has a substantial stock interest. Barber & Baldwin, Inc., while serving the group as underwriting agents, will continue as in the past to serve other insurance companies and reinsurance groups, thus producing a pool of interests that will afford the distribution necessary for the broad coverage and large indemnities required for the protection of the expanding aviation industry.

The group is under the leadership of Horatio Barber, F.R.Ae.S., M.I.Ae.E., supported by the following directors: Prof. Alexander Klemin; A. L. Gates; Hartwell Cabell, Cabell, Ignatius & Lown; Major General Mason M. Patrick; Charles E. McManus; L. Brooks Leavitt; Col. Benjamin F. Castle; Major George L. Lloyd; J. V. Forrestal; Walter W. Colpitts; Henry Moir; Thomas B. Boss; and Frederick B. Rentschler.

(Continued on next page)



(P & A Photos)

The Graf Zeppelin Comes Across on 465 SKF Bearings

A GREAT, gray monster of the skies, lighter than the air its giant propellers thrust astern, pushes its nose through the autumn sea-mists and hangs suspended for a moment above a great city, as though making its curtain call and taking its share of well-earned applause while millions of upturned faces register their appreciation of the fact that another page has been written in the history of passenger transportation.

An entire world had waited while the five great Maybach Motors sang their songs of progress across the great Atlantic wastes—a world afraid as that other world of 1492 must have been afraid when three caravels cleared the Port of Palos and pointed their prows toward a new and unknown world. And yet, in the one hundred and more cities throughout the world where SKF offices are located there was a feeling of hope, of confidence, of belief.

Had not Lindbergh made his historic flight with the help of SKF Bearings? Didn't they help to carry Chamberlain to Germany, Byrd to Ver-Sur-Mer, Maitland and Hagenberger to Honolulu?

Weren't they on the Los Angeles when she flew on her maiden voyage to America?

And were there not four hundred and sixty-five of these same SKF Bearings in the motors and in the other mechanical parts of the Graf Zeppelin?

SKF

SKF INDUSTRIES, INCORPORATED

40 East 34th Street, New York

2176

"THE HIGHEST PRICED BEARING IN THE WORLD"

(New York Air News continued)

A COURSE in airplane design and stress analysis has been added to the evening curriculum of the School of Science and Technology, Pratt Institute, Brooklyn. This course takes students directly into drafting work, which includes layout for a small three-place airplane with an air-cooled engine. The instruction will include such factors in airplane design as stress analysis including the theory of beam and column design, strength of airplane materials, design of fuselages, wing beams, fittings and other parts.

A prerequisite knowledge of algebra, quadratic equations, trigonometry, and design is necessary for admission to the course. Some of the larger airplane manufacturers have arranged to employ such men as qualify after graduation from this course.

The course, which is under the supervision of Michael Gregor, a consulting aeronautical engineer, convenes every Monday, Tuesday and Thursday evening. Occasionally, men who are actively engaged in airplane design will deliver special lectures.

AIR ASSOCIATES, INC., have established an aviation consolidated ticket office in New York City. The opening of this office makes it possible to book passage or obtain information on nearly all the airlines operating in the United States and Canada, and many of those operating in Europe. Where it was formerly necessary to write or telegraph to each individual airway company's office, it is now an easy matter to obtain information or tickets for any or all routes by applying at the consolidated ticket office. This office is located at 535 Fifth Avenue.

DEMAND for airplanes in South America, Canada and Japan, as well as in this country, will soon put the new plant of the Fairchild Aviation Corporation, Farmingdale, L. I., on a capacity schedule. The recently completed plant employs modern production methods and the step-by-step assembly process.

According to Ernest Robinson, vice president of the Fairchild company, they will soon begin production of a newly designed small monoplane. It is predicted that this new plane, which is designed especially for use in flying instruction, will obviate many of the dangers which usually obtain in student flying.

READJUSTMENT of the financial structure of the Sikorsky Manufacturing Company takes place with the formation of a new company to be known as the Sikorsky Aviation Corporation. Under this arrangement, the new company, which acquires the assets of the old, will have capital amounting to 200,000 shares of no par value. The present management will retain 100,000 shares, the remaining shares having been underwritten by G. M.-P. Murphy and Company, James C. Willson and Company, and National Aviation Corporation. Officials of the company expect this introduction of new capital to double production.

The new company has arranged a contract with Curtiss Flying Service, Inc., by which the latter is to have exclusive rights for the sale of Sikorsky planes for commercial use in the United States. A similar contract gives the export sales to Curtiss Aeroplane Export Corporation.

E. O. McDonnell, of G. M.-P. Murphy and Company, is chairman of the Executive Committee of the new company. The board of directors includes: James Bruce, vice president of National Park Bank; J. Cheever Cowdin, vice president of Blair & Company, Inc.; A. C. Dickinson, president of the Sikorsky company; Victor Drury; O. A. Glazebrook, Jr.; Henry G. Hotchkiss; Chas. S. (Casey) Jones; H. O. King; John Newell, Jr.; Joseph E. Otis, Jr.; Earle Hay Reynolds; Igor Sikorsky, vice president and chief engineer; Andrew R. Smith; R. C. Stanley; H. E. Talbott, Jr.; B. Tompkins, vice president of Bankers Trust Company; and James C. Willson.

INTERNATIONAL AIRWAY CO. ORGANIZES

ORGANIZATION of Aviation Corporation of the Americas was completed early in October. Through Pan American Airways, Inc., as its operating company, Aviation Corporation of the Americas will project and manage a system of international air mail and passenger routes between the United States and the West Indies, Central America, and South America. This system, one of the largest in the world, will extend over 4,000 miles in length through twelve different countries. The greater part of this mileage will be flown on a daily schedule.

This new company has acquired all of the outstanding stock of Pan American Airways, Inc., which pioneered the air mail and passenger service from the United States to Latin-America. The airline operated by Pan American Airways between Key West and Havana was recently extended to Miami. Two other projected routes will probably be opened soon. One of these is between Miami and San Juan, Porto Rico, and the other between Miami and the Canal Zone.

Serving on the board of directors of Aviation Corporation of the Americas, which is also the new board of Pan American Airways, Inc., are: R. F. Hoyt, Hayden, Stone & Co.; C. V. Whitney, director, Guaranty Trust Co.; J. T. Trippe, president of Pan American Airways, Inc.; Robert Lehman; Lyman Delano, executive vice president, Atlantic Coast Line Railroad; S. M. Fairchild, president, Fairchild Aviation Corp.; W. A. Harriman; Leonard Kennedy; George Mixter, Stone & Webster; S. Sloan Colt, vice president, Farmers Loan & Trust Co.; E. O. McDonnell, member G. M.-P. Murphy & Co.; W. H. Vanderbilt; Grover Loening, president of Loening Aeronautical Corp.; Graham B. Grosvenor, vice president of Fairchild Aviation Corp.; John A. Hambleton; R. B. BeVier and Robert W. Atkins, Hayden, Stone & Co.

CANADIAN COLONIAL AIRWAYS, INC., of New York City, has appointed the M. P. Gould Company, Inc., advertising agency of New York City, to direct its advertising account.

FOR the fifth consecutive year, the Brooklyn Polytechnic Institute will offer this winter a course on Diesel engines comprised of illustrated lectures, classroom exercises and laboratory work. This course is not a part of the regular undergraduate work of the Institute but is open to anyone interested in oil engines regardless of his previous education. The course is divided into three branches, coördinated under the supervision of Prof. E. F. Church, Jr., head of the department of Mechanical Engineering. Edgar J. Kates delivers the illustrated lectures; laboratory exercises are conducted by Prof. W. J. Moore; and classroom discussions are conducted by Prof. F. D. Carvin.

ACCORDING to an announcement of Mr. George W. Vought, president of Chance Vought Corporation, that company has again broken all records by shipping from the Long Island City plant, during September, airplanes and spare parts valued at $410,000.

This exceeds by 35% the former monthly record, and, it is believed, creates a new peacetime record for plane production in this country, particularly as this figure does not include the cost of the "Wasp" engine, the propeller, or instruments.

Also a new record for quarterly shipments was made when planes and parts valued at $950,000 were delivered by the Vought plant during the third quarter. This is a 300% gain over the similar perod of 1927, and also exceeds, by a small margin, the shipments for the entire first six months of 1928.



Officials and department heads of the Summerill Tubing Company, Bridgeport, Pa.
Left to right: J. Wesley Smith, Pilot, Otis Fry, H. C. Knerr, Raymond Lawson, Samuel Kelso, Willis Wolf, John Covely, Franklin Cassel, R. H. Gabel, Wm. H. Baker, N. H. Wolf and S. L. Gabel.



THE *SAFE* SPARTAN

Tulsa's Latest and Greatest Contribution to Aviation

AS the "Oil Capital of the World"—home of many great oil companies, and world headquarters for research in connection with the development and perfecting of aviation gasolines and motor oils—Tulsa has made fundamental contributions to the progress of aviation.

Now, however, comes her latest and greatest achievement in the field of aeronautics—the development of *a safer airplane.* Improved gasolines brought reliable engine performance. Improved motor oils brought smooth operation. The SPARTAN Airplane brings enhanced *security* in the air vehicle itself!

SPARTAN super-safety is not an empty boast but is a scientific fact. The SPARTAN is the most perfectly balanced ship yet developed. Its center of gravity is low and the load is carried directly upon it, with the result that travel of the center of gravity at varying loads has been reduced practically to zero. This, coupled with design that is thoroughly in accord with the principles of aerodynamics, has resulted in a stability hitherto unequalled. If the controls are released in mid-air, regardless of the ship's position, it will tend to return automatically to a horizontal, straight ahead course and will fly itself until the pilot again assumes control.

Among the remarkable results of SPARTAN perfected design is the fact that the ship is "spin proof." More than 100 expert pilots have tried to force it into a tail spin, with power both on and off—without success. SPARTAN is also practically stall proof, as when it approaches the stalling point it slowly drops its nose and starts forward again.

To perfection of balance and stability have been added the safety factors of highest grade materials, exhaustively tested to guard against flaws, and sturdy, dependable construction, tested at every step. Instruments are the finest made. Motor is the powerful and dependable WALTER 120/135 H. P. 9-cylinder radial air-cooled engine, manufactured at Prague, Czecho-Slovakia, and holder of seven world records in flight. • • • • • • Our new catalog in full colors is now ready—sent on request.

"Designed to BE Safe . . . Built to STAY Safe"

SPARTAN AIRCRAFT COMPANY

Tulsa, Oklahoma

BINGHAMTON

By John G. Babcock

AFTER more than a year of controversy and investigation of prospective airport sites in this community, a decision has finally been reached to construct the new airport at West Endicott, 10 miles from Binghamton's center, on the landing field of the Endicott Aero Club. More land is to be obtained, and hangars and additional runways will be provided.

Definite plans for the new airport were made possible through the interest taken in the project by officials of the Endicott Johnson Shoe Manufacturing Corp., who agreed to subscribe for 70 per cent of stock in a new corporation to finance the project. The new company will become a subsidiary to Colonial Western Airways, Inc., and George W. Johnson, vice president of the E-J Corporation, will be elected a director of the latter.

Runways at the new port will be 2,500 feet long and 150 feet wide. As soon as the east and west runways, now being graded, are ready for use, planes of the Colonial company will make this the chief stop on the new Buffalo-New York route. This will cut more than 100 miles from the present flying distance of Colonial planes between New York and Buffalo, which now follow the Rochester, Syracuse-Albany line. It also will complete Colonial's projected Toronto-New York City line.

AN air meet will be held in Oneonta, 70 miles east of Binghamton, as a big feature of the Armistice Day celebration to be held there November 12, under auspices of the American Legion and Veterans of Foreign Wars. A number of aviation events are being planned, and prizes will be awarded winners.

UTICA

By Harry Ward Seward

UTICA FLYING CLUB has been formed by a group of students of the Utica Flying Service, Inc. These students have purchased and taken delivery of a Waco plane and have established headquarters at Utica airport. The plane will be used by the club members in securing the number of hours in the air needed for commercial pilot licenses.

Harold Scott has been appointed chief pilot of Utica Flying Service by Reginald I. Heath, manager. He takes the place of Richard Botsford, who recently resigned as vice president.

RICHARD BOTSFORD and John H. Wright have incorporated Botsford Flying Service. This firm has been appointed distributor for this section of New York for the Curtiss-Robin company. Forty students are now receiving instruction in the Botsford school. Charles L. Witherin is piloting for the Botsford service.

This company is also representing the Challenger line of ships, as well as the Ryan Brougham models.

CHARLES D. STEARNS has been named district manager for Utica for Colonial Airways, Inc. Mr. Stearns, who has established his headquarters at Hotel Utica, is handling all details of passenger and freight movement over the lines.

S. EARL TABER, president of Utica Flying Service, Inc., has announced that his company will shortly take delivery of a new Stinson-Detroiter cabin plane. The service has also taken the Central New York representation for the Irvin Air Chute.

CENTRAL NEW YORK AIR NEWS

By Mildred Marvin

THE Finger Lakes airport on the Canandaigua Turnpike, at the outskirts of the city of Geneva, was formally dedicated at a three-day air meet on September 28-29-30.

Among those who gave short addresses are: Mayor Henry T. Maxwell, President Claire H. Pierce of the Rotary Club, President Frank J. Murphy of the Kiwanis Club; President Thomas D. Quinan of the Geneva Automobile Club and Alderman Charles Wheeler, chairman of the chamber of commerce aviation committee. Vincent S. Welch, secretary of the chamber of commerce, presided.



The municipal airport at Buffalo, N. Y.

PENNSYLVANIA NEWS

FOKKER AIRCRAFT CORPORATION recently placed a large order for 140 steel two- and three-blade propellers with the Standard Steel Propeller Company, of West Hempstead, Pa. This is one of the largest orders ever made for commercial airplane propellers.

A NEW one and one half million dollar air terminal for Philadelphia is to be located three miles from the business center of the city, about a mile northeast of the Navy Yard. The plans call for two large brick and steel hangars, each one hundred feet in span by one hundred and twenty feet in length with twenty-foot high doors at each end. Shops also will be provided as well as spacious pilots' quarters.

The terminal building will have waiting room, offices, weather bureau, radio room and dispatcher's office.

Runways will provide for landing and take-off in any direction. Around the boundary of the field will be built concrete taxi lanes so that planes may reach any portion of the field with ease. A complete and novel night lighting system will be installed, with automatic operation of the landing lights for any wind direction. Directional radio, and a complete receiving and sending station are included in the plans.

THE Aircraft and Airways of America, Inc., recently organized in Pittsburgh, has been appointed distributor for Ryan monoplanes in Ohio, Pennsylvania, New Jersey, and part of New York. The company plans to engage in air transport business from Pittsburgh and to organize a School of Aviation. Five Ryan Broughams were recently delivered to the company.

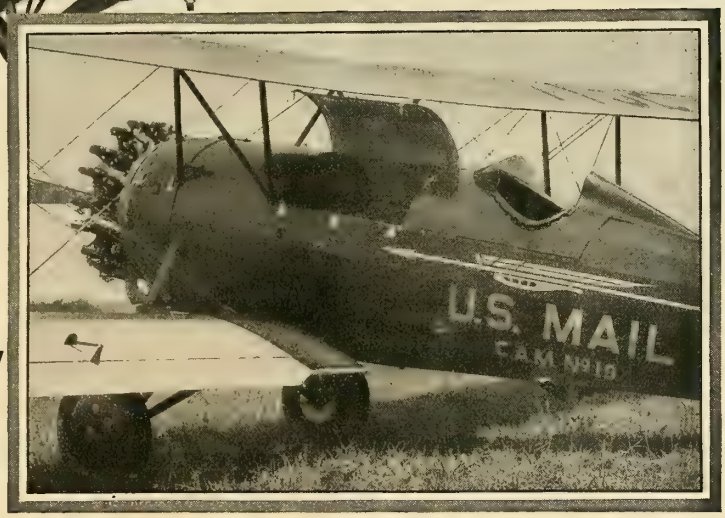
F. Le Moyne Page organized the company and is president. Raymond A. Tucker, besides being technical advisor to the president, is vice president in charge of sales. Other officers are: J. M. Schoonmaker, Jr., Norman Allderdice, William J. Sampson, Jr., and Myron C. Wick, Jr., vice presidents; Bernard Peyton, secretary; J. P. McKinney, Jr., treasurer; and William B. Schiller, Jr., assistant secretary and treasurer.

Philadelphia Aircraft Show

THE first annual Philadelphia Aircraft Show, sponsored by the Aero Club of Pennsylvania, will be held November 3rd to 10th inclusive in the 108th Field Artillery Armory, Broad Street and Susquehanna Avenue, Philadelphia.

The show committee is composed of: Charles T. Ludington, president, Ludington Philadelphia Flying Service, Inc.; J. Wesley Smith, president, Philadelphia Air Transport; C. W. Larner, president, Keystone Flying Corp.; Virgil Kauffman, president, Aero Service Corp.; Frederick A. Riedel, president, Crescent Air Service, Inc.; Edgar N. Gott, president, Keystone Aircraft Corp.; Major J. Sydney Owens, Commander, 28th Division Air Service; Ralph D. Weyerbacher, Commander, Philadelphia Naval Aircraft Factory; W. R. Huntsman, general manager, B. B. T. Corp. of America. Ray Krimm is director of the show.





CARGO-SPACE and SPEED—The Pitcairn Super-Mailwing!

The combination of adequate cargo space and high cruising speed found in the new Pitcairn Super-Mailwing makes the ship the logical choice of air mail operators.

The mail compartment is 40 cu. ft. in size and can accommodate 500 lbs. of mail and express. It is entirely free from cross-members and wires, and its cover opens from either side of the fuselage.

The pilot's cockpit is provided with an adjustable seat, which can be raised to increase visibility for landing or taking off.

The Pitcairn Super-Mailwing, completely equipped for night flying, and powered with Wright Whirlwind Engine, is priced at $11,500. We shall be pleased to submit complete specifications and performance data at your request.

PITCAIRN AIRCRAFT, INC.

LAND TITLE BUILDING - - PHILADELPHIA

NEW JERSEY AIR NEWS

THE Griggs Whippet-Knight Co., of Newark, has been appointed dealer for Eaglerock planes and has purchased a plane from the Sulzberger Aircraft Sales Corp., distributors for the Alexander Eaglerock.

NEWTON may now be identified from the air by a large sign on the Newton Laundry Corp. building. The sign, for which Lieut. L. J. Sweeley is responsible, has letters 17 feet 6 inches high. Plans for a flying field at Newton are under consideration.

THE International Oxygen Company of Newark has taken over the Tariffville Oxygen and Chemical Company of Tariffville, Conn. This plant which will be operated by a newly formed company, The Tariffville Oxygen Company, as the New England division of the International Oxygen Company, will continue to manufacture oxygen, hydrogen and acetylene and will handle in addition nitrogen, primogas, compressed air and liquid air together with the complete International Oxygen Company line of "International" and "Eyeosee" welding and cutting apparatus and supplies.

Bendix Buys Majority Interest In Eclipse Machine Company

THE Bendix Corporation of Chicago recently purchased the majority interest in the Eclipse Machine Company of Elmira from the General Motors Corporation. A few weeks previous, General Motors had made an equivalent purchase from the heirs of the late Edward J. Dunn, former president of the company.

The plants of the Eclipse Machine Company at Elmira and at East Orange, N. J., will continue to operate under the same management. The plant at East Orange specializes in the manufacture of starting equipment for aviation engines and other standard aviation devices.

John C. Ferguson is president of the company; William L. McGrath, vice president; and William C. Warner, secretary-treasurer.

Asbury Park Airport

WORK on the development of a new 150-acre airport at Asbury Park is now under way. This airport, which is about three miles from the city, will have a north-south runway 4,300 feet long and another at right angles to it 3,500 feet long. Being nearly square, this will be an eight-way field when completed.

Asbury Park Air Service, Inc., and Ocean and Monmouth Aviation Club, which recently merged with it, will operate from the field. Airplane taxi service and flying instruction will be offered. Later, the company plans to engage in the manufacture of training planes.

Allen R. Heuth, who had an important part in the erection of the Wright memorial beacon at Kitty Hawk, N. C., is largely responsible for the Asbury Park airport. William H. Martin is general manager of the new air service company, and Verne E. Treat is field manager and chief pilot.

RENEE LaCOSTE, internationally famous tennis player, and G. Birkidt, a young graduate engineer, recently came to America as representatives of the Societé Francaise Hispano-Suiza. They intend to spend several months here studying the manufacture of aviation engines in the plant of the Wright Aeronautical Corporation at Paterson. Their coming to this country followed an arrangement between the Wright corporation and the Hispano-Suiza company by which the latter is to have manufacturing and sales rights for Wright products in Norway, Denmark, Sweden, France, Spain, Portugal, Greece, Belgium, Holland, Switzerland and Turkey.

DELAWARE AIR NEWS

A NEW company, to be known as the Moth Aircraft Corporation, was recently incorporated under the laws of the state of Delaware. This company, by a contract with the DeHavilland Aircraft Company, Ltd., of England, will manufacture and sell D. H. Moth planes in the United States. J. A. Ritchie & Co., Inc., and Pratt & Company are the underwriters.

Minton M. Warren is president of the new company, and J. E. Morrow and Frank M. Smith are vice presidents.

RHODE ISLAND NEWS

By Thomas F. Bresnahan

THE What Cheer Airport at Pawtucket was officially dedicated October 12, 13 and 14, when more than forty planes attended an air meet there under the auspices of the Rhode Island National Guard Officers' Association.

This meet was the first of any proportions that Rhode Island has ever experienced, and there is no doubt but what the citizens of the state have become more air-minded—at least 100,000 of them have after seeing the meet.

"Kiddy" Barrows did his favorite stunt of making dead stick landings, and, of course, "Waco", his pet monkey, was perched on his shoulder at all times. Then there was Ted White making parachute jumps. Three marines from Quantico, Lieut. L. H. Sanderson, Lieut. W. R. Hughes and Master Sergt. Pelchoir, provided most of the stunting thrills.

Gov. Norman S. Case of Rhode Island presided at the dedication ceremonies. Among others in attendance were Capt. Earl Fleet, who provided some of the stunting, Lieut. Bob Fogg of Concord, N. H., and Mrs. Fogg.

Douglas Harris is chief pilot at the airport.

WESTERLY'S first airport opened last month. Frederick Kruezberg, former German ace, is the proprietor. He was formerly connected with the Stonington, Conn., airport.

HERBERT G. FALES of the Du Pont Company at Wilmington, Del., desired to spend the week-ends with his family at Newton, Mass. So he got himself a Stearman. He now flies to the What Cheer Field at Pawtucket each week-end and makes the remainder of the trip by train.

JAMES E. HOWARTH, a graduate of the United States School of Military Aeronautics, has become chief pilot for the Rhode Island School of Aviation at Rumford. This school is being operated by John L. Lafariere, who was in the Signal Corps during the war.

JOSEPH GAGLIONE, president and pilot of the Rhode Island Airways, Inc., was feted by his fellow compatriots at a banquet Columbus Day. Joe recently flew from Colorado Springs to Providence, a distance of 2,200 miles, in 21 hours' flying time.

THE Brown University Aero Club is again functioning this year at Pothier Field, Buttonwoods, under the supervision of Paul Dujardin, president of the club. The club is using a Sikorsky plane, the property of Dujardin.

ALABAMA AIR NEWS

By Robert H. Brown

A COURSE in aviation has been instituted at the Birmingham-Southern College, to be taught by Major Sumpter Smith, Commandant of the 106th Observation Squadron of the Alabama National Guard. Demonstrations are given at Roberts Field, near the campus.

LIEUT. LLOYD BARNETT, of Roberts Field, has opened a class on military aviation for the air reserves. Classes are to be held twice a month. A correspondence course on military aviation has been started this year for air reserves who are unable to attend the classes.

DUE to the fact that the lights on the New Orleans-Birmingham-Atlanta mail line are not yet ready, mail planes northbound will run their schedules up one hour. Planes scheduled to leave Birmingham at 4:55 p. m. will leave at 3:55 p. m. As soon as the lights are installed, the original schedule will be resumed.

MAJOR PAGE S. BUNKER, state forester, has enrolled with Lieut. Johnny Gill, of Roberts Field, for instructions. Major Bunker will use a plane to cover the state on matters pertaining to forestry.

WORK of lighting Roberts Field, Birmingham, is progressing rapidly. The contract was let by the city commission to General Electric Co. and installation will be made by city electricians.

CITIES and communities within a radius of 100 miles of Birmingham are to be visited in the interest of promoting the use of air mail. Major Sumpter Smith and Leander Poole, of the mail service, will make the trips and will point out to the people the advantages of air mail.

MULTIPLE FEATURES

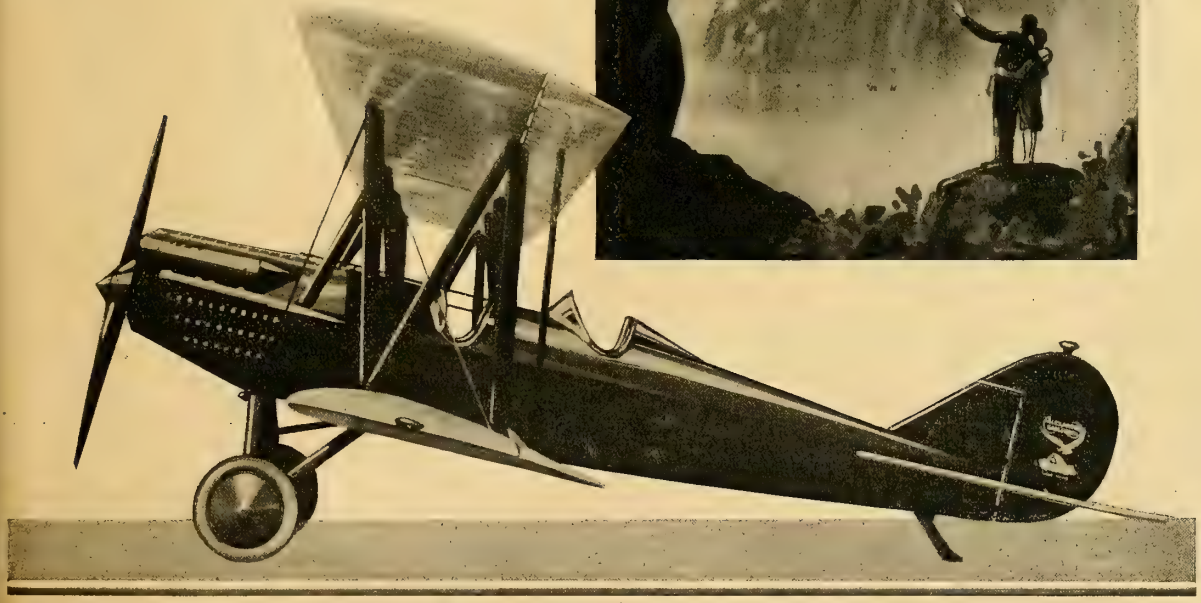
THE response to the throttle—the quick take-off—the life—the movement—the control at all speeds—the spirit—the color—the things you have always wished for in an airplane—all combined with safety and good looks * * * THAT is EAGLEROCK! * * * It possesses style—detail—finish—and the ability to stand up, day after day * * * EAGLEROCK is the standard of comparison in its class.

When you buy an EAGLEROCK equipped with a Whirlwind J-4 or J-5, Hisso "A" or "E" or Curtiss OX-5 or OXX-6 you buy a ship built under U. S. Department of Commerce inspection and CERTIFIED. It is priced at $2250 on factory field less power plant and propeller. Certain motors require center section tank and wobble pump as extras.



ALEXANDER AIRCRAFT CO.

Dept. 403, Alexander Industries, Inc.
Colorado Springs, Colo.



EAGLEROCK

ARKANSAS AIR NEWS

By Carl Olsson

PURCHASE of a controlling interest in Command-Aire, Inc. (formerly Arkansas Aircraft Corp.), manufacturers of Command-Aire biplanes, by Robert B. Snowden, Jr., of Memphis, Tenn., and his subsequent election as president of the company, have been announced by officials. Charles M. Taylor remains as vice president, and W. I. Moody, former president, has become secretary and treasurer. Plans to increase the capital stock from $100,000 to $1,000,000 have been announced. A recent addition to the plant gives the company about twice the floor space it originally had. A large number of interested visitors attended a formal opening of the plant on the day of the start of the Arkansas air tour.

POSSIBILITY of an airline through Arkansas was expressed recently by H. E. Barber of St. Louis, vice president and general manager of the Universal Air Lines, Inc., who visited Little Rock to make arrangements for the use of the Little Rock airport as a landing field on the proposed route. He said the proposed route would be from Dallas to Columbus, Ohio, by way of Marion, Ill. At Marion it would connect with a line operated from Omaha by way of Kansas City and St. Louis.

THE accommodations and facilities offered at Toney Field, Pine Bluff, were attested to by its being used as an overnight stop for the Los Angeles-Cincinnati air races, which followed the air exposition in California.

A large crowd was on hand to greet the Class A and B fliers, who were given a banquet and were entertained in various ways on their visit to Pine Bluff.

The Arkansas Air Tour

THREE new airports, enlargement of three others, and two airports under construction are believed to be direct results of the Arkansas Air Tour, which was held September 25, 26 and 27, under the auspices of the Little Rock Chamber of Commerce. The air tour was promoted to increase air-mindedness in the state and to stress the importance of airports of such size as to permit the landing of large planes.

Although the number of planes entered in the tour was not as large as expected, those interested in the tour were pleased with the response toward increased air facilities from all sections of the state. Plans were made to include 25 ships in the party, but only 14 actually were entered. There were 35 passengers and pilots.

Alexander Field at Fort Smith and Murphy Field at Newport, two of the three new fields in the state, were dedicated while the tour was on. The other new field is located at Arkadelphia. The enlarged fields are at Conway, Hope and Monticello, while construction has started on new fields at El Dorado and Texarkana. When the two new fields are completed, there will be about 20 airports in the state, all able to handle air traffic.

Preceding the start of the tour, members of the party made an inspection trip through the plant of the Command-Aire, Inc., located near the Little Rock Airport.

From Little Rock, points of call on the tour were made in the following order: Conway, Fort Smith, Hot Springs, Arkadelphia, Hope, Monticello, Pine Bluff, Lonoke, Newport and Forrest City. Overnight stops were made at Hot Springs and Pine Bluff.

The following sponsored planes in the tour: Home Insurance Company, W. P. Galloway Company, Frigidaire distributors, Mutual Life Insurance Company, Arkansas Motor Club, Union Trust Company, Colonial Baking Company and Command-Aire, Inc., all of Little Rock; Russell Lambert and the Felix Smart Motor Company, of Pine Bluff; the Fort Smith Chamber of Commerce, and the 154th Observation Squadron, Arkansas National Guard.

The following pilots were in the party: Murray Hall, Lawrence Banks, Lieut. Gordon S. Darnell, Ellis Fagan, Charles M. Taylor, Lieut. Charles Shoemaker, Capt. Wright Vermilya, Lieut. Joe T. Shumate, Lieut. Arthur A. Robertson and Major J. Carroll Cone, all of Little Rock; Allen Scott, of Pine Bluff; Mrs Phoebe Omlie, Capt. Charles Baugham and John B. Bell, of Memphis; F. H. Muncie and Ted C. Bell, of Fort Smith; and L D. Ruch of Kansas City, chief pilot for the American Eagle Aircraft Company.

THE Hot Springs Chamber of Commerce Airport is located about two miles from the city and is marked "Hot Springs" in 12-foot letters inside the white circle. These letters, of white stone set in concrete, afford exceptional visibility. Hangars with a 6-plane capacity have recently been constructed at the field, and complete servicing will soon be available.

On their goodwill tour through Arkansas, 13 planes carrying 33 passengers on a 1,000-mile trip, which was sponsored by the chamber of commerce of Little Rock, stopped overnight at the airport.

COMMAND-AIRE, INC., has closed a contract with the Phylax Company of Berlin by which it becomes exclusive North American distributor of what is said to be the only automatic fire extinguisher for airplanes on the market, according to a recent announcement by R. B. Snowden, Jr., president and general manager of the Little Rock concern.

The new apparatus consists of a central chemical tank with pipes leading to seven vulnerable points about the plane. At the end of each is a nozzle which automatically releases a high pressure spray the moment fire occurs, extinguishing the flames instantly.

The device is already used on commercial and government planes in Europe and has proved its efficiency in actual fire emergencies in the air, as well as under test conditions.

WASHINGTON D. C. NEWS

By Sam Barker

THE trimotored Ford plane operated by the Universal Flyers, Inc., has caused unusual crowds to gather around Hoover Field. Mr. Leo Rocca, one of the partners of the Triangle Motor Company, Washington dealers for the Ford, states that 3,784 passengers have been carried in the plane since its purchase in September. En route to Washington, the plane "barnstormed" (one should say barnstormed de luxe) at Lima, Marion, Columbus and Akron. The plane left Hoover Field on October 16 for an itinerary which will take it throughout the United States. Mr. Rocca states that the plane will be on the road for approximately a year and a half, and will solicit passenger business through Ford dealers under whose auspices it will fly.

THE Potomac Flying Service has again changed hands; it now is under the control of a group of Washington investment bankers, with John S. Wynne as general manager. "Doug" Powell is chief pilot, and one Wasp-powered Fairchild and two Eaglerocks are busy with student instruction and sightseeing trips over the Capital City.

WASHINGTON AIRPORT, INC., is running a service between New York and this city when business warrants, and expects to run daily soon. Ryan monoplanes are used on this service.

WALTER A. BROOKE, former Department of Commerce inspector, has organized a club for student instruction. He is using a new Lincoln-Page at an airport on the Silver Spring road.

MARSHALL S. BOGGS, of the Aeronautics Branch, has been putting in a lot of time at Bolling Field with the Buhl Special Airsedan. He recently flew Hon. Wm. P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, on a tour of the east and middle west.

THREE Consolidated training planes equipped with "Hissos" are expected at Bolling for the use of Air Corps reserve officers. There is only one "PTI" available for their use at this time.

CAPTAIN JOHN W. DAVIS, JR., recently appointed Aeronautics Trade Commissioner for South America, has arrived at his post at Rio de Janeiro, according to the Bureau of Foreign and Domestic Commerce. He reports great interest in aeronautics on the part of Brazilians.

LEIGHTON W. ROGERS, Executive Officer of the International Aeronautics Conference to be held in Washington in December, has opened offices in the United States Chamber of Commerce Building. He reports that over 50 foreign governments have signified that they will be represented. Arrangements are being made for the delegates to be flown from New York to Washington.


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Sole North American distributors for the PHYLAX AUTOMATIC FIRE EXTINGUISHER for airplanes.
Approved Type Certificate No. 53
COMMAND-AIRE, INC.
LITTLE ROCK

FLORIDA AIR NEWS

By Johnson Wright

THE Pan American Airways is having rock runways constructed on its new Miami airport. The original plans had provided for grass runways, but because those which were being prepared at that time were damaged considerably by the storm of September 16th, rock runways were deemed advisable.

AMONG the distinguished airmen who have visited Florida recently are the Hon. Captain Frederick E. Guest, M. P., Britain's war time Minister of Aviation, and Captain Harold Applegate, who spent about ten days in Miami during September. During their visit, they made a flight to survey the damage wrought in the Bahama Islands by the storm of the 16th and also one to survey the damage in the Lake Okeechobee region, using their DH Moth, which was equipped with pontoons.

OTHERS in the air field who contributed services in the great hour of need following the hurricane were A. B. Chalk, who got up out of a sick bed to which he had been confined with a severe cold, when he was called upon by the relief agencies to carry supplies in his Waco seaplane into the Lake region, and the Pan American Airways, who cancelled their flights with the mail on both the 19th and 20th in order that the Sikorsky S-38 could be used for survey flights and the transportation of supplies in the stricken area. The big ship was in the air most of those two days, and the service performed was invaluable. J. E. Yonge, chairman of the Miami Municipal Aviation Board and a war time flier, acted as observer on the survey flights.

MORE than 20,000 persons participated in the civic parade and watched the stunts, air pyrotechnics, and formation flights engaged in by army, marine corps, and civilian airplanes at the dedication of Orlando's new municipal airport on October 4. Doyle E. Carlton, Democratic nominee for the governorship, was the principal speaker.

What is believed to be the first Dixie aircraft show was opened during the afternoon in the big hangar at the new airport. Several aircraft manufacturers displayed their ships and accessories at the show.

S. A. BELCHER, Florida distributor for Travel Air, has organized the Florida Skylines, Inc., and has opened up a new airport in Miami, east of the new Pan American port. An administration building, the first of a number the company plans to erect, has been completed.

The airport is the closest to the center of the city of any in the Miami district and will no doubt be extensively used by visiting airmen during the coming winter.

ARTHUR E. CURTIS, Miami passenger agent for the Pan American Airways, was recently named a special faculty representative for the University of Miami for the aviation course which has been added.

THIRTY-SEVEN planes roared in the St. Augustine Derby dedicating the new Junior Chamber of Commerce airport on October 6-7. Doug Davis, of Atlanta, won the 30-mile race for ships of 100 horsepower or less, and also took first place in the dead stick landing contest, bringing his Waco to within eleven feet of the marker. Not being content with first place in two events, Davis went up and tied with Fred Lund, of Troy, Ohio, for first place in the stunting contest. Lieut. J. F. Gill, of Maxwell Field, was the winner in the 30-mile free-for-all race.

OFFICIALS of the Colonial government of the Bahama Islands have given the proposal of the Pan American Airways their approval, and only the consent of higher officials in London is awaited to put the service into effect. The airways officials have also submitted bids to the post office department in Washington for the carrying of United States mail from Miami to Nassau. If this contract is secured, they will then carry the mail both ways.

A new Wasp-powered Loening cabin amphibian of the airways was flown to Miami recently by Lieut. S. W. Calloway and has been substituted for the Sikorsky on the Miami-Key West leg of the Miami-Havana route. The Sikorsky, thus released, has been used to make survey flights over the Miami-Nassau route. Three round trips have been made to date with as many as five passengers in addition to the crew of three. Edwin Music, veteran pilot, has piloted the amphibian on all of these flights, the first of which was made in 1 hour, 46 minutes outgoing and 1 hour, 55 minutes for the return over the 187-mile route. The proposed service provides for three round trips out of Miami each week, the return being made the same day.

GEORGIA AIR NEWS

By Al Major

ALBANY recently staged one of the most successful airport openings ever seen in this part of the country. Twenty army, navy and commercial pilots cooperated to make the flying events for the two days very interesting. Among the pilots and ships registered were: Major Beverly and Lieuts. W. B. McCoy, Wm. H. McArthur, B. A. Glover, C. W. Ernest, I. W. Ott and N. L. Cotes, flying Douglas bombers and PTs, all of Maxwell Field, Montgomery, Ala.; Lieuts. D. S. Cornwall, G. Van Deurs and F. L. Baker, flying Curtiss Hawks of the Naval Air Station, Pensacola, Fla.; and the following commercial pilots: Errett Williams, Greenville, So. Car., OX-5 Eaglerock; D. N. Davis, Atlanta, Aeromarine Travel Air; T. F. Johnson, Jr., Waco-Siemens, Atlanta; George Shealy, OXX-6 Travel Air; Dr. J. E. Owens, Asheville, No. Car., OX-5 Eaglerock; Larribe Hand, OX-5 Waco, Pelham, Ga.; Neil Stewart, OX-5 American Eagle, Decatur, Ga.; Joe Russell, Monocoupe, Moline, Ill., and Miss Gladys Poole, Atlanta's only aviatrix.

A dinner was given to the visiting pilots at the Hotel Gordon by the Chamber of Commerce at which George W. Jones, Jr., president of the chamber, presided.

The events and winners on the first day were as follows: Twenty-mile race for ships with motors not exceeding 510 cubic inches—won by Doug Davis in his Aeromarine Travel Air. Dead stick landing contest—won by Dr. Owens in his OX-5 Eaglerock. Stunting contest—won by Errett Williams in his OX-5 Eaglerock. Twenty-mile free-for-all race won by Lieut. Cornwall in his Curtiss Hawk. Flying exhibitions were given by the army and navy, and a stunting exhibition by Miss Gladys Poole.

The second day's events were substantially the same. All of the visiting pilots pronounced the new Albany municipal airport to be one of the finest to be found in the southeast, both as to drainage and approaches.

ATLANTA'S airport was recently visited by the B. F. Goodrich Company's Fairchild cabin monoplane, flown by that famous pilot, Cy Caldwell, Aero Digest writer, and carrying as passengers H. A. Bauman, Goodrich factory chief, and Mr. and Mrs. Vogeler.

ATLANTA'S Debutante Club recently staged a flying party with the assistance of John K. Ottley, Jr., local Pitcairn representative, and through the courtesy of the J. P. Allen Company.

WILLIAM B. HARTSFIELD, chairman of the Aviation City Council, recently proposed that Atlanta add $1,000,000 to the proposed bond issue to be voted on shortly. $500,000 of this money would be used for the regrading, upbuilding and buying of Candler Field and the additional $500,000 used for the purchase and equipping of a North Side Airport. A North Side Airport would be excellent, in the opinion of this writer, as it would provide an airport nearer to the city.

DECATUR plans to have a modern aviation field. John Wesley Weeks, president of the Chamber of Commerce, has named a committee on aviation activities, with Claud Blunt as chairman, which will endeavor to locate a suitable site for an airport. For a number of years, ships have been using a field near Decatur, known as Tuggle field. This field, however, is not large enough to accommodate large ships.

MISSISSIPPI NEWS

JACKSON MUNICIPAL AIRPORT will be formally dedicated November 9-10 with an air meet and air races. The meet has been sanctioned by the National Aeronautical Association and will be put on under its supervision.

During the meet, Jackson Municipal Airport will furnish gas and oil, and transportation to and from the field for visiting pilots. Prizes totaling $2,425 will be given the winners of the various events, among which are the On-to-Jackson race, balloon-busting and dead stick landing contests, army and navy races, commercial free-for-all races, etc.

Lapping—

for the Extreme Accuracy and High Finish Required by Makers of Airplane Motors



Norton Lapping Machines now make possible at a high rate of production the extreme accuracy and finish that is demanded in the manufacture of airplane motors. They have changed lapping, long considered the ideal method of attaining this accuracy and finish, from a slow, laborious hand operation to a real machining operation.

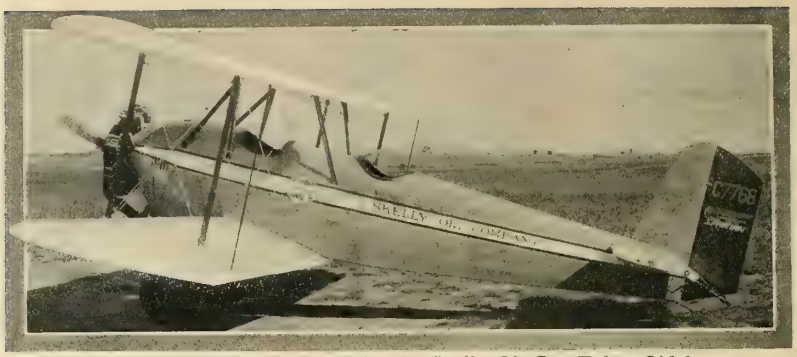
NORTON COMPANY, WORCESTER, MASS.

NORTON

Grinding Wheels
Grinding Machines

Refractories-Floor
and Stair Tiles

Say you saw it in AERO DIGEST



One of the Spartan planes used by the Skelly Oil Co., Tulsa, Oklahoma

OKLAHOMA AIR NEWS

By Ernest W. Fair

BENNETT H. GRIFFIN, director of the bus division of the Oklahoma state corporation committee, has joined the Oklahoma Air Transport Company and will serve as a part time instructor at the local branch of the company. James Hazlip, formerly instructor at the branch, has been named chief pilot and instructor with the new Spartan School of Aviation at Tulsa.

The Oklahoma Air Transport Company recently opened a school at Chickasha. They now operate schools at Elk City, Norman and Oklahoma City.

TED MOFFIT, formerly with the Braniff Airlines, is now pilot over the Wichita Air Service Provision Company's Kansas City-Wichita line.

C. M. McMULLEN has been appointed aviation editor of the Oklahoma City Sunday *Oklahoman*.

OKLAHOMA CITY has devised a new method of securing oil for the maintenance of the runways at the municipal airport. Waste oil from filling stations and garages is to be collected by the city for this purpose.

THE Kansas City-Fort Worth airline to be operated by Braniff Airlines will open December 10. Fokker Super-Universals will be used. A service, operating once each week-end between Norman, state university city, and Tulsa, has recently been started by Braniff Airlines.

The Okmulgee-Ponca City airline of the Braniff company has been discontinued.

C. M. McCALL, formerly with the McIntyre organization at Tulsa, has been named manager of the Wewoka airport. Citizens of Wewoka and Holdenville, adjacent cities, are making plans for a joint airport.

NORMAN is to vote a $50,000 bond issue for an airport. It is proposed that $40,000 be spent for the purchase of the land, $4,000 for lighting, and $6,000 for runways and improvements.

THE Standard Aircraft Company of Oklahoma City has been issued a charter. I. V. Gray and J. B. Gray, of Tulsa, and Charles Gray, of Oklahoma City, are the incorporators. The home office of the company is to be in Oklahoma City.

BILL BENNETT has been appointed manager of the Burke Airport at Okmulgee.

W. J. MACKENZIE, of the Department of Commerce, recently completed a tour of the state, boosting airports for the cities he visited. His tour included: Tulsa, Wewoka, Holdenville, Miami, Afton, Claremore, Muskogee, McAlester, Sapulpa, Bristow, Stillwater, Pawhuska, Blackwell, Alva, Woodward, Clinton, Elk City, Borger, Cordell, Hobart, Mangum, Altus, Chickasha, Guthrie, Norman, Ardmore, Durant and Oklahoma City.

CHARLES PARKER, formerly with the Spartan Aircraft Company, is now with the Braniff Airlines on the Tulsa-Oklahoma City line.

THE Phillips Petroleum Company's second airplane was delivered when Billy Parker, Phillips' pilot, flew the Whirlwind-powered three-place open Travel Air biplane down from Wichita on October 14.

THE factory for the Star Aircraft Company, which manufactures the "Cavalier", a small two-place cabin monoplane powered with a Velie M-5 five-cylinder radial, is nearing completion on Phillips Airport. Operations are expected to start in the near future. Two ships have been built to date.

TULSA AIR NEWS

THE Spartan School of Aeronautics, a subsidiary of Spartan Aircraft Company, began operations late in September at the Tulsa municipal airport. A new $50,000 building, in which the ground school will be located, is now under construction. Standard equipment for the school is the Spartan C-3, powered with Ryan Siemens or Walter 9-cylinder air-cooled engines. During the first week, thirty students enrolled at the school.

Captain C. F. Gilchrist is in charge of the school, and James Hazlip is chief pilot and instructor. Among those included on the staff of instructors is Dr. William Friederich, who was formerly chief research engineer for aeronautics for the government of Czechoslovakia.

Flo Flying Services of Detroit and Ann Arbor, Michigan, has been appointed sales agent for Spartan airplanes for the state of Michigan. During a recent visit to Tulsa, Lieut. Leonard S. Flo, president, took delivery on his third Spartan plane in as many weeks.

C. L. (Bud) Hussey, well known pilot on the Pacific Coast, is to be general manager of a new aviation corporation organized in Los Angeles by a group of oil men. This company has taken the distributorship for Spartan airplanes for California and Arizona, and will appoint dealers in that territory.

THE first unit of Spartan Aircraft Company's new factory is now in operation. Designed and built according to modern standards, this factory will turn out five planes per day. The factory site is located five miles northeast of Tulsa and a quarter of a mile south of the municipal airport. Although all rigging will be done at the factory, Spartan will operate an assembly plant and have a salesroom and hangar at the airport.

TEXAS AIR NEWS

EGAR TOBIN AERIAL SURVEYS, INC., San Antonio, recently made an aerial survey of an oil pipe line route for the Texas Pipe Line Company. The survey extended from Monahans to San Marcos, a distance of 250 miles. Being particularly wild and mountainous, this region was almost inaccessible to field parties. At least, if a ground party had undertaken the survey, it would have taken about three months longer and would have cost nearly half a million dollars more.

PILOTS LEWIS MOORE and Victor Martin, flying J-1 Standard Dusters powered with air-cooled radial Rhone engines, have returned to Houston having just closed the cotton crop dusting season for the year.

These planes are from the fleet of eight cotton-dusting airplanes operated by Texas Aero Dusters, a Houston enterprise, owned by Capt. J. C. Tips, Jr., and T. L. Smith, Jr., pioneers in the airplane insect control industry in Texas.

During the season just closed, which started in June, these pilots dusted 24,650 acres of cotton in boll weevil control, using upwards of 450 tons of calcium arsenate. Much of the acreage treated had three and four applications of poison, each of 6 pounds per acre.

THE city of San Angelo has made a contract with the Orange Car and Steel Company for the construction of an 80′ x 100′ steel hangar. The erection of this hangar is a part of the city's program for the development of its new airport. The field secured for this purpose is fairly clear of obstructions on all sides. Its dimensions are 3,000′ x 3,000′.

Contract for the hangar was let to Lieutenant W. K. Ennis who is manager of the Airport Division of Orange Car and Steel Company.



AS EXPERTS SEE US

J. Warren Smith, McKeesport, Pa., nationally known air mail and transport pilot, passes judgment on the Travel Air Cabin Monoplane.

When J. Warren recently visited the Travel Air factory to take delivery of two Travel Air planes for mail service on the Ball Air Mail lines, he had his first chance to thoroughly inspect, test and fly a standard production Travel Air Cabin Monoplane.

And this is what he said:

1—The same wonderful control in a "Stall" is found in this Monoplane as in all Travel air biplanes. This is especially remarkable in a Monoplane. There is plenty of "Lateral" when you need it.

2—Has the same wonderful load factor and take-off as in all Travel Airs. Load it down, get in the air and you don't know you have a load. Take-off and landing ability in small fields truly remarkable.

3—Consideration given everywhere for lubrication, such as landing gear joints which have bushings and hollow bolts for Alemite oiling: Saves expensive replacement. Gives new landing gear struts for the price of a 25c bushing. All control joints constructed for ease of lubrication.

4—Landing gear bolt corrugated on end to prevent turning; forces friction and wear onto the bolt and bearing; allows the oil to go where it should go.

5—Cross section of wing ribs of wood with grain in separate directions to hold its stiffness; prevents any change in wing curve due to dampness.

6—All nails, tacks and screws plated to prevent rust.

7—Cap strips in wings put on with screws to allow for vibrations and not stick through fabric.

8—Lots of "Dope" around the Travel Air factory; dope enough not only to tighten and finish but to keep linen tight all the time.

9—No hammer or chisel marks anywhere. A finished job in the finest of workmanship.

10—Cabin seats built with consideration of comfort of passenger. They fit the occupant.

11—Pilot's seat so comfortable can fly for 4 to 5 hours without getting tired.

12—Experience built into every detail even to a leather map case right at the pilot's seat.

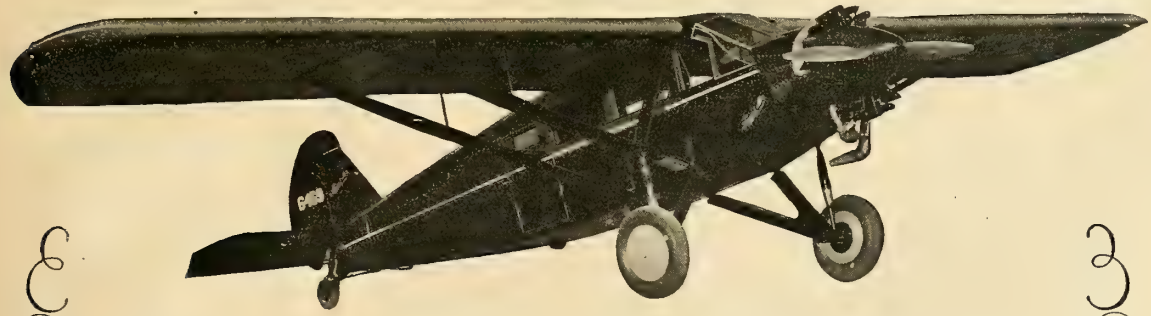
13—"I have never seen anybody get out of a Travel Air but that was in love with it; no criticism of any kind.

14—"And of course all proven factors of Safety and Dependability are incorporated in this new Travel Air."



Catalogue sent on request

Travel Air makes eight types of airplanes to fill every commercial need



TRAVEL AIR MFG. COMPANY

"The Standard of Aircraft Comparison"

WICHITA, KANSAS

DALLAS AIR NEWS

By Capt. W. H. Scott

THE Dallas City Commission has ordered the purchase of 298 acres of land, nine miles west of the city and twenty miles from Fort Worth, for a combined army training school and joint air mail landing field and terminus.

With the field goes a beautiful seventeen-room clubhouse, that was once the country home of a leading citizen of Dallas. This home will be fitted up as a residential club by officers of the air reserve living in Fort Worth. The cost of the field was $75,000.

The money represents part of a $400,000 bond issue, the remainder having been spent for the purchase of Love Field, which was bought for $325,000 and which is now used solely for commercial aviation.

The new field will be used by air mail lines and active units of the air corps. It will be leased by the city to the federal government at a nominal rental of one dollar per year.

Arthur Reinhart, street commissioner of Dallas, said the United States treasury department will assign six ships to the field for use in prohibition enforcement, while six ships of the 366 Air Reserve will be available at all times for the training of air reserve officers.

Lieutenant Harry Weddington will be in charge of the field, while Major Josef H. Noyes is in command of the 366 Air Reserve.

FORMATION of the Dallas Aeronautic Association, to be composed of leading business men and aviators of Dallas, will be completed during November. The sponsors are John Philip, postmaster of Dallas, B. B. Owen, past president of the Dallas Flying Club, and Martin Weiss, vice commander of the Aviation Cadets of America. Captain W. H. Scott is acting as organizing secretary.

FOUR cities in Texas now have squadrons of Aviation Cadets of America, an organization started in Dallas by flying men to teach boys between the ages of 15 and 20 the groundwork of aviation. It is purely a patriotic venture. The training is taken from government air school manuals. The squadrons now in operation are at Dallas, 100 boys; Fort Worth, 125 boys; Corsicana, 25 boys; and Waco, 20 boys. Other squadrons are being formed at San Antonio, Denton, Greenville and other cities in Texas. Present plans are for enlarging the organization into a national movement.

Aviation cadets are used by their respective cities to assist at the air field. The instruction is carried on by reserve officers of the air corps. Each squadron is run by the boys of that particular squadron, but charters are granted only after the cadets are sponsored by some recognized luncheon club or chamber of commerce.

Major Josef H. Noyes is national commander; Martin Weiss, vice commander and treasurer; Capt. J. L. Freeze, national recruiting officer; Capt. E. V. Day, Y. M. C. A. squadrons; Capt. Bill Long, aeronautics; B. B. Owen, chief pilot; Mayor R. E. Burt, vice commander. The offices are at 911 Elm St., Dallas, where all information as to forming squadrons can be obtained.

CHATTANOOGA NEWS

By James S. Lindsey

MERCHANTS and citizens of Chattanooga responded favorably to Postmaster Springfield's requests for pledges to the use of air mail to connect with the New York mail at Atlanta. Pledges have exceeded the amount necessary to justify the line.

THE Interstate Airlines, Inc., who are operating the Chicago-Atlanta route, will begin carrying Chattanooga mail on a daylight schedule about December first.

COMMANDER C. T. BLACKBURN, vice president and general manager of Interstate Airlines of Chicago, made a hurried trip to Chattanooga last week to confer with Benjamin King, president of the Tennessee Air Tranport Co., regarding a hook-up of the two concerns at Chattanooga. Following this conference the lease on Marr field, heretofore held by Benjamin King, was transferred to Interstate Airlines, and it is expected that the sale of Mr. King's interest to Interstate Lines will be announced shortly.

UNDER the direction of the Chattanooga Woman's Club, many airplane models were exhibited at the Interstate Fair held recently in Chattanooga. Benjamin King, president of the Tennessee Air Transport Co., judged the many beautiful models on display. James S. Lindsey won first prize with his Curtiss Hawk scale model. Justin Brown came second with his trim little Standard. Chester Cramer came third with a flying model of the *Spirit of St. Louis*.

LOUISIANA AIR NEWS

By Harold A. Dempsey

NEW ORLEANS is to have a Lakeshore airport if plans of the Airport Commission mature. Governor Huey P. Long, Mayor Arthur O'Keefe, the Association of Commerce, and the Young Men's Business Club have endorsed the plans of the Commission.

Recommendations of the New Orleans Airport Commission consist of the location of new municipal landing facilities for sea- and landplanes on the shore of Lake Pontchartrain, near the Industrial canal.

THE New Orleans Flying Club, Inc., has been formed. Officers of the new club are: L. H. Folse, president; Fred W. Breedlove, treasurer; and William L. McKinney, secretary.

It is the plan of the new organization to purchase planes and, by putting such expenditures on the club plan, to reduce their cost to each member.

The Mereaux-Nunez field, on the St. Bernard road, has been leased by the club from the Louisiana Airways, and an order for the first plane has been given.

NINE commercial airplanes, of various sizes and makes, and three United States Army Curtiss biplanes constituted the South's first good-will aerocade.

The tour was started from the Menefee Airways, Inc., field in New Orleans and visited Bogalusa, La., Hattiesburg, Laurel and Jackson, Miss., and Tallulah, Monroe, Ruston, Shreveport, Mansfield, Nactchitoches, Orange, Crowley and Baton Rouge, La.

It was sponsored jointly by the Menefee Airways, Inc., and the *Item-Tribune*. Tom Gillan of the *Item-Tribune* conceived the idea and in conjunction with F. W. Gavin, sales manager of the Menefee company, did much of the preliminary work. They both made the pathfinding flight with James Waddell, vice-president of Menefee Airways, as pilot.

Robert Bauman, manager of the Menefee Airways, Inc., was manager of the aerocade. C. J. Rowe, of the Department of Commerce, had charge of the inspection of planes. Jimmy Wadell, chief pilot of the Menefee company, led the aerocade in a Ryan monoplane, with four passengers. Other planes in the tour were: three Lincoln-Pages, two passengers each; one Travel Air, two passengers; three Army combat planes of the third attack group from Fort Crockett, under Major Druette; two planes from Huff-Daland Dusters of Monroe; one plane from Southern Dusters of Tallulah; one plane from E. M. Sellers Airways of Jackson; one Redline plane from Shreveport; one plane from Breazeale Airways of Natchitoches; one plane from Lutcher-Moore Lumber company of Orange, Texas; and one plane, a Monocoupe, owned by Professor Holly of Tulane University, New Orleans.

Passengers in the nine commercial ships included: James C. Menefee, James I Smith, Charles Karst, Jr., J. R. Jacobs, S G. Evans, Joseph Nolan Maurin, F. W Gavin, Robert E. Bauman, J. H. Fortson, R. E. E. de Montluzin and J. I. Byrne. Commissioner T. Semmes Walmsley officially represented the city of New Orleans on the tour.

MAJOR DELOS C. EMMONS and Major J. B. Brooks were recent visitors to Shreveport. They came from San Antonio, Texas, in Army planes to inspect a site across Red River in Bossier parish offered by Shreveport as a location for the third attack wing, proposed for Shreveport.

HERNDON FIELD, at Mansfield, has been greatly improved during the past month, due chiefly to the efforts of T. B. Herndon, who is manager of the field and the Louisiana representative of the Monocoupe plane. The field is located just two miles from the city of Mansfield.

THE St. Tammany Gulf Coast Airways, Inc., is offering passenger service to football games played by Louisiana institutions in adjoining states. An inaugural trip to the Tulane-Mississippi A & M game at Jackson, Miss., was made in the four-passenger cabin plane of the company.



THE BERLINER MONOPLANE, a commercial and training plane ideally appointed for use by the private owner, has been designed by one of America's outstanding aeronautical engineers in collaboration with nationally known pilots. It is manufactured throughout from the highest grade of materials and built by skilled and seasoned airplane mechanics.

In service its clean lines, beauty and attractiveness of design prove again the adage that "Planes that *look right, fly right*". Although far more stable than other ships of its size, it has that maneuverability demanded by the most exacting pilots. The Berliner Monoplane gives maximum performance with minimum maintenance.

Every part of this monoplane has been designed as though it were the most important part of the ship, and has been engineered to reduce air resistance without sacrificing a single comfort or safety factor. The graceful and efficient cantilever wing, sturdy chrome molybdenum steel fuselage and husky fittings combine to make this the outstanding monoplane offered in the world's market for 1928.

Berliner Monoplanes are being produced in quantity under Department of Commerce approved type certificate No. 39. An ample number of new OX-5 motors are available. The plane is built to take motors up to 220 HP.

Price: With Curtiss OX-5 Engine, $3,290, Flyaway Hoover Field, Washington, D. C.

Excellent dealer territory still open. Write!

BERLINER AIRCRAFT COMPANY
ALEXANDRIA VIRGINIA

Berliner Monoplane features are plentiful, including exceptional visibility, easy access to passenger compartment, ease of rigging, inspection and maintenance, interchangeable parts, readily removable radiator and gas tank, improved stabilizer control, and highly efficient hydraulic-spring shock absorber.

SPECIFICATIONS

Length overall, 25 feet 10 inches; height overall 8 feet; airfoil Goettingen 398; span 36 feet; area of wings and ailerons 219 sq. feet; weight empty, 1400 lbs.; gross weight loaded, 2300 lbs.; high speed (full load, sea level), 105 m.p.h.; landing speed, 41 m.p.h.; absolute ceiling, 16,000 feet.

ST. LOUIS AIR NEWS

By A. W. League

ST. LOUIS is to be the headquarters of the Transcontinental Air Transport Corp. This city has been made not only the operating center but also the home of the general offices, including the purchasing department. The company has practically decided to take possession of a 570-acre tract just south of East St. Louis. It is understood that the east-side site is preferred over Lambert Field because of its proximity to the business district, the east-side location being only a 10-minute drive from downtown St. Louis, while Lambert Field is a 45-minute drive.

THE effect of the airport bond issue is becoming more apparent at Lambert Field each week. The control building, which will contain the office of the field manager, a lounging room for pilots and visitors, and a switchboard controlling the field lights, is nearing completion. It is a one-story building, with brick chimneys for two large open fireplaces, is topped with a turret for observation purposes, and will support a floodlight. Other improvements now going forward include the installation of a water system, the filling and grading of the field, the removal of the fence which formerly was the northern boundary of the field, and the starting of a concrete apron 250 feet wide in front of the hangars on the west side of the field. Boundary and hazard lights have been placed on the principal buildings of the field. There is an urgent need for hastening the installation of the field lighting system, because the trimotored passenger plane from Chicago, which arrives at 6 p. m., will be landing in darkness in another month.

THE Curtiss-Robertson Mfg. Co. has placed an order with the Curtiss Aeroplane and Motor Co. for 100 Curtiss Challenger motors, which will be installed in the Robin. "Red" Jackson, who made a good record with a Swallow in the transcontinental air race, is now test pilot for the Curtiss-Robertson Company. Gentry Shelton takes care of the ferrying end of the company.

THE Pickwick Airways, Inc., a new concern organized to furnish transcontinental air-bus service, has announced its intentions of making St. Louis the night control station on its proposed transcontinental route. Starting from Los Angeles in the evening, travelers will use the 26-passenger Pickwick Nite Coach, awakening the following morning at Phoenix, Arizona, aviation field. From there, planes will carry them east, making stops at El Paso, Dallas, Tulsa, Springfield and Kansas City, with the first day's destination set at St. Louis. At St. Louis the trip will be resumed by night coach to Chicago, arriving in the early morning hours, with passengers rested and ready for a business day—or a further hop to New York by airline. Bach Air Yacht monoplanes, powered by three Pratt and Whitney Hornets, will be used on the route. The line will be put into operation as quickly as its fleet of planes can be completed.

A REDUCTION in rates on the passenger airline operated between St. Louis, Springfield, Peoria and Chicago by the Robertson Aircraft Corp., has been announced. Traffic has been markedly better than expected, the planes carrying from eight to ten passengers daily. The new rates are as follows: St. Louis to Chicago—$30, round trip $55; St. Louis to Peoria—$19.50, round trip $37; St. Louis to Springfield—$11.50, round trip $21.50.

TWELVE expert workmen of the B. F. Mahoney Aircraft Co., were recently brought to St. Louis from the Mahoney Plant at San Diego, Calif., in six Ryan Broughams. The workmen, welders and technicians began installing machinery in the new Mahoney plant at Lambert Field under direction of John C. Nulsen, general manager. The first Ryan Brougham is expected to be turned out of the new factory about November 15th.

SIX advanced students of Parks Air College have received notice of their successful qualification for federal licenses as limited commercial pilots. The students, all of whom have had more than 50 hours solo, took their tests under the supervision of R. D. Bedinger, Department of Commerce Inspector.

Parks to Manufacture Planes

PARKS AIRCRAFT, INC., a new company which is to be located at Parks Airport, near East St. Louis, will begin production of a cabin monoplane about January 1. Construction of a modern factory, which will cost $175,000 was started at Parks Airport the week of October 1. This plant, which will measure 560 x 100 feet, will turn out planes at the rate of 200 per month. Approximately 300 workmen will be employed in the new factory.

Two models of the monoplane are under construction at the field and will be tested soon. Oliver L. Parks, vice president and general manager of Parks Air Lines; Amos O. Payne, designer of the Swallow; and Richard F. Hardin, designer of the Army round-the-world planes, collaborated in working out the details of design for the new monoplane. This plane will afford space for four passengers and a pilot.

The new Lycoming air-cooled motor, developing more than 200 horsepower, will probably be used in the plane.

Under the arrangements of the "Parks Plan" as formulated by H. P. Mammen and Oliver L. Parks at the opening of Parks Air College last March, only Parks-trained men will be employed in the new factory and in the sales agencies. Even experienced pilots and mechanics, upon joining the Parks organization, will be required to spend some time at the college so that they may become familiar with Parks methods. This has been planned to assure uniformity and efficiency in the operation of every branch of the business, and at the same time, to guarantee a paying job for anyone who satisfactorily completes the course at the air college.

A brief outline of the activities at Parks Air College will perhaps help one to understand the whole Parks system. The college is divided into a flying school and a mechanical school, both of which operate on a well worked-out program. In the flying school, for example, a plan has been devised by which all confusion and delays are avoided. Each student is assigned a particular time for flying instruction, and when that time arrives, his plane and instructor are on the field ready to take off. If, after a few hours in the air, any student is found unfit for flying, he must necessarily be dismissed from the school. The ground school parallels the first class modern school in details of its equipment and its schedule arrangement.

The mechanics' school, now in its new building, has equipment features comparable to the finest service schools. Students in this department not only receive instructions in engine theory, but also engage in building planes modelled after standard types. This department is under the supervision of Richard F. Hardin.

The officers of the new Parks Aircraft, Inc., are: Harry P. Mammen, president of Parks Air Lines, president; Oliver L. Parks, vice president, and Fred W. Gardner of the Gardner Motor Co., executive vice president. Directors, in addition to the officers named, include: Russell E. Gardner, Jr., president of Gardner Motor Co., chairman; Oliver A. Anderson; and Thomas Reyburn of the Gardner Motor Co.

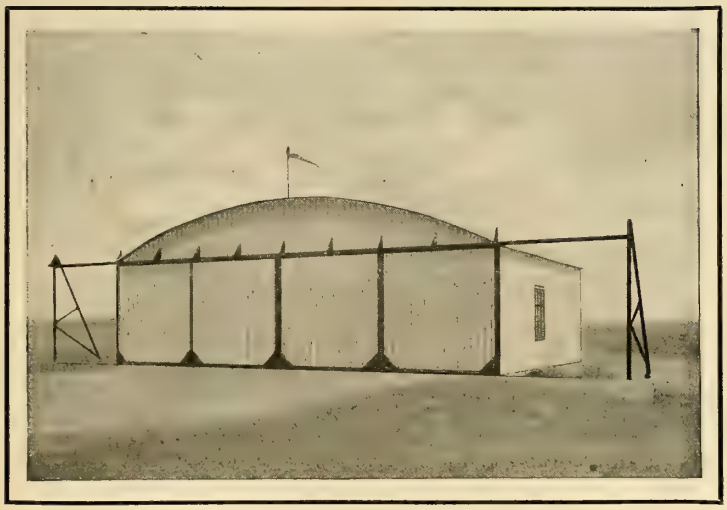


Aerial view of Parks Airport, showing administration building



Los Angeles Air Race Winner *uses* BUTLER STEEL HANGAR





Mr. Halliburton of the Halliburton Oil Well Cementing Company, Duncan, Oklahoma, owner of the Butler Steel Hangar shown here was winner of the Class C Transcontinental Trophy.

The Butler Steel Hangar is one of many Butler steel buildings used by the Halliburton Oil Well Cementing Company. A. D. Stoddard, Chief Engineer of the Company, says, "The Butler Steel Hangar has proven very satisfactory."

Steel Used Throughout

Butler Hangars are made entirely of steel. The wall and roof sheets are 24 gage tight-coated galvanized steel with deeply paneled corrugations. These corrugations are deeper and wider, stiffer and sturdier than mill rolled corrugations. Naturally, Butler Hanagars are non-combustible.

Bolted Construction Used

The Butler Hangar is rigid. All sheets are bolted together and to the steel frame with galvanized bolts.

Good Lighting Arrangement

Plenty of light can be secured. Under all working conditions the lighting is good. Convenient electrical lighting arrangements can be made.

Doors Operate Easily

They open easily and they close easily. They operate on steel rails and are roller bearing equipped.

Other Desirable Features

Butler Steel Hangars are ready-made. They are ready to erect and come complete. They may be economically enlarged. They may be taken down, moved and re-erected with practically one hundred per cent salvage.

Prices are f. o. b. plant or erected. Send for complete information on why the Halliburton Company is so satisfied with the Butler Steel Hangar.

BUTLER MANUFACTURING COMPANY

KANSAS CITY, MO. MINNEAPOLIS, MINN.

KANSAS CITY AIR NEWS

By H. H. James

THE *Skyway*, the first airplane of the Butler Aircraft Corp., a subsidiary of the Butler Manufacturing Co., successfully passed its test flights at the Fairfax Airport, Kansas City, on October 4.

The Butler Manufacturing Co., long identified with the airplane industry through the manufacture of steel hangars and other airport equipment, about sixty days ago started construction in its own plant of its first airplane, designed by Waverly Stearman.

The *Skyway*, a three-passenger biplane, was piloted on its maiden flight by Howard Jones.

CONSTRUCTION work has been started on the largest airplane hangar in the Kansas City area, which is being erected on an airport development of the Woods Brothers Construction Co. on the Kansas side. The hangar will have a capacity of forty planes and also will provide class rooms for four flying schools.

The airport being developed by the Woods Brothers organization includes the present Fairfax Airport. Additional land and Goose Island in the Missouri River will be added to the field, giving it a total of more than 1,000 acres.

The Woods Brothers company has also purchased the hangar and club house of the Sweeney Flying School at Fairfax Airport, and these buildings will become units in the development. The new building is 80 x 160 feet. All the buildings on the airport will be painted orange, because of its high visibility.

More than twenty planes are now at the airport, including two large Stinson-Detroiter machines.

MAIL planes on the Chicago-Kansas City-Dallas route, operated by the National Air Transport, Inc., soon will be equipped to receive weather and other reports by radio while in flight. Plans are laid for the installation of short-wave radio transmitters at different points along the route and for the equipping of the planes to receive the messages. A building for the radio station has been erected at the municipal airport, and a part of the equipment has been received. The stations will be operated by the Department of Commerce, with arrangements to provide the planes with weather reports and instructions.

ACTIVITIES at the old Richards Field, now operated by Commercial Airways, Inc., are booming, according to A. A. Yeomans, who is in charge of the field. Twelve students have been enrolled in the 50-hour flying class. All ships at the field have been overhauled, and Miller valve actions and Scintilla magnetos have been installed on fourteen plane motors.

PAUL BRANIFF, INC., of Oklahoma City, will establish an airplane passenger service between Kansas City and Dallas, Tex., on December 10. Stops will be made in Oklahoma City.



E. E. Porterfield, Jr.

American Eagle Aircraft Corporation's Enlargement Program

A $1,000,000 refinancing program announced recently by officials of the American Eagle Aircraft Corporation, Kansas City, includes erection at Fairfax airport of an airplane factory with an annual capacity of 1,200 planes.

The new factory with a total floor space of more than 60,000 square feet is to be erected at the southwest corner of Fairfax airport, on a two-acre tract just purchased from the Union Pacific Railroad Company. There will be three buildings—a two-story office structure, the main factory building and the paint shop. The factory will be 100 by 350 feet and will be of fireproof, daylight type construction. The plant is to be completed by December 15.

The American Eagle Aircraft Corporation has built and delivered more than 400 airplanes since the first was assembled in 1926.

E. E. Porterfield, Jr., is the president of the company; D. L. Chick, vice president and treasurer, and Mord M. Borgie, secretary. The directorate includes, in addition to the officers, Barney Oldfield, pioneer auto racer and automotive engineer, and Charles Carroll O'Toole, New York attorney.

Operating in conjunction with the American Eagle Aircraft Corporation are the Porterfield Flying School, Inc., and the Crescent Propeller Company, the latter a new organization manufacturing propellers and aircraft accessories. The flying school is at Fairfax airport, and there are eighty-six students enrolled in the various ground and flying courses. The holding company for the three companies is the American Eagle Aircraft Corporation of Delaware.

In the new plant two types of planes will be built. One is to be the present commercial biplane, and the other, an all-metal three-passenger monoplane.

Growth of the Porterfield Flying School has been so rapid recently that it has been necessary to move the headquarters, classrooms and laboratories into new and larger quarters downtown. Space will also be provided for a display room in which the various products of the American Eagle Aircraft Corporation will be exhibited.

MINNESOTA AIR NEWS

By W. S. Schley, Jr.

ESTABLISHMENT of a new national network of flying schools, with headquarters and home field at Wichita, Kans., was announced at St. Paul recently with the combination of Air Service, Inc., Twin Cities aviation school and interests headed by E. A. Watkins, president of the Watkins Manufacturing Company of Wichita.

Mr. Watkins, who acquired the controlling interests in the new school project, will head the chain of schools and general offices, which will adopt the name now used by the Twin Cities concern, Air Service, Inc. General offices and a school will be established in Wichita, according to Mr. Warsinske, president, but the Twin Cities school will continue on a much larger scale, as the Northwest headquarters.

DEFINITE arrangements for a test hop on a proposed new airline into the Twin Cities have already been made by the Spokane civic association. Both mail and passengers will be carried on the projected line.

The test hop will be made from Spokane by Nick Mamer, former St. Paul flier. Mamer is head of the Mamer Flying Service on the Coast.

THE Stinson School of Aviation was formally opened with a meeting in the council chambers of St. Paul's city hall recently. Jack Stinson, president of the company, and J. L. Loftus, general manager, arrived from Detroit to make the arrangements for the opening of the school, which will train pilots and mechanics.

AN "Air Mail Show" was one of the features of the Greater Minneapolis Industrial Exposition and the National Food Show. The exhibition centered about one of the mail planes which was daily dismantled, after completing a flight, brought into the building and reassembled in view of the spectators.

AN aviation field day was held on October 4 at the St. Paul municipal airport. Among the craft which performed was Speed Holman's ship, in which he won the Los Angeles to Cincinnati derby.

AN aerial parade over the city featured the three-day celebration in dedication of the 107-acre air field at Mankato. The contingent of airplanes, including four army planes (one flown by Capt. Ira C. Eaker, Washington, pilot for F. Trubee Davison, Assistant Secretary of War for Air), circled the city in formation.

LIEUT. GEORGE M. PALMER, regular army instructor for the past five years for the 109th squadron, was given a farewell dinner and smoker by the 109th squadron, 34th division, and the staff officers of the Adjutant General's department. Lieut. Palmer has been transferred to Langley Field.



AT THE HUB of the nation's airways... five minutes by motor car from the Kansas City business district, is an airport that spreads out invitingly to the aircraft fraternity over its entire 687 acres—the largest body of airport land so closely adjacent to a metropolitan business section in the country. Immediately across the Missouri River, within ten minutes of the postoffice, is another airport of 200 acres.

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WICHITA AIR NEWS

By Edwin W. Pryor

TRENDS in airplane engine development were discussed at the meeting of the aeronautic division of the American Society of Mechanical Engineers in Wichita, September 21 and 22. Among those who delivered addresses were: Richard M. Mock, Bellanca Aircraft Corp.; George K. Burgess, director of the Bureau of Standards; Dr. C. K. Francis, chief technologist of the Skelly Oil Company; Jerome Lederer, of Aerotech; and E. E. Porterfield, Jr., president of the American Eagle Aircraft Corp.

THE third Swift two-place biplane produced by the Swift Airplane Company of Wichita has been delivered to Capt. E. C. Tips, of Tips and Smith, Houston, Texas. The job is powered with the Quick motor. The second produced went to H. H. Patton, president of Quick Motors Company. Tips and Smith are interested in the motor company with Mr. Patton.

EXPANSION of the Swallow Aircraft Company factory on a huge scale is announced by Victor Roos, general manager. Immediate construction of new units is planned. The company plans to produce transport type ships, in addition to the three-place biplanes it now turns out.

BANDITS in Wichita will have a tough time if the plans drawn up by Chief of Police O. W. Wilson and local fliers work out. Several fliers have been commissioned, and a system of plane-ground signals utilizing panels of orange-colored cloth has been arranged.

The fliers will be notified immediately of any crime and will comb the country for the bandit car, keeping in touch with the officers on the ground by means of the signal system. Pete Hill, president of Travel Air Transportation Company, is one of the originators of the idea.

T. T. MARONEY, a wartime flying instructor with about 3,500 hours in the air, visited in Wichita recently with his four nephews, G. C. and Spencer Quick, with the Cessna Aircraft Company, and C. E. and Tom Quick, with the Quick Air Motors Company. Maroney had quit flying five years ago and engaged in the hotel business at Sacramento. Recently he sold out, however, and is contemplating opening a flying school and plane agency in the California town.

While here he conferred with the manufacturers of planes in Wichita. Maroney flew to Wichita from Los Angeles with Earl Rowland in the Warner-motored Cessna monoplane, and was enthusiastic in his praise of the flying qualities of the plane.

A. KOERBLING, Department of Commerce aeronautical inspector, recently resigned to accept a position as chief pilot for the Aeronautical Schools Association, planning an "air college" in Wichita.

The association plans the construction of a $60,000 building on the new airport, to include dormitories, class rooms, hangars, woodshops, and machine shops.

Arch Merriam is general manager of the school, George H. Arbenz is sales manager, and Ted Braley, formerly president of the Braley Flying School, is operations manager. The Braley school merged with the association.

George Siedhoff, president of the Supreme Propeller Company, is president of the school. Walter Beech, president of Travel Air, Inc., also is interested in it.

ROBERT SHIPLEY won first prize in a model plane contest staged by the Boy Scouts of Wichita recently. Second honors were divided by Paul Ziegler and Eugene Stanley. Event prizes consisted principally of airplane rides offered by local plane manufacturers.

CAPTAIN WALTER SITZ, graduate of Annapolis, has been named head of the aeronautical school of the University of Wichita, succeeding Amos G. Payne. Mr. Payne resigned to accept a position with a St. Louis plane company.

ALL pilots in the air reserve unit of the 7th Corps Area, with the exception of five or six, have been transferred to the 561st observation squadron, with headquarters at Wichita. The corps area includes Kansas and parts of Missouri and Nebraska.

(*Continued on next page*)

BUILT TO WIN!

B.G. Equipped Planes were the Leaders in the National Air Races

THE 1928 National Air Races were more than a competition of skillful and daring piloting. In this great proving ground of the air, results show another series of enviable records for B.G. Spark Plugs.

In the Transcontinental Races, Classes A, B and C, B.G.-equipped planes placed

1st, 2nd and 3rd

In the Closed Course Events, in which planes powered with "Whirlwind" and "Wasp" engines were entered, B.G. Plugs scored again:

11 out of 11—1st place
11 out of 11—2nd place
8 out of 9—3rd place

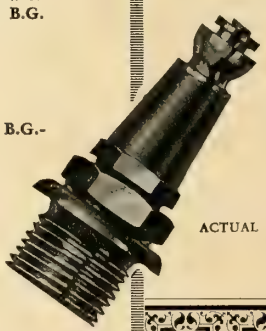
In the Mitchell Trophy Race (Curtiss D-12 engines) B.G.-equipped planes placed

1st and 2nd

And again, in the Mason M. Patrick Trophy Race (Curtiss D-12 engines) they placed

1st, 2nd and 3rd

All "Whirlwind", "Wasp" and "Hornet" engines in the Transcontinental Non-stop Race were equipped with B.G. Spark Plugs.



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Hinton and Prince of Wales

The photo shows Lieutenant Hinton describing the flight the NC-4, of which he was pilot, to the Prince of Wales. As a flier, Hinton ranks among the country's few. And as an instructor he represents a combination impossible to beat—long experience, painstaking study and a natural ability to make things clear to others.

THE fact that you're looking through this magazine is proof that you sense the thrill of this great, big, new, booming, bustling, rushing industry—AVIATION. And the fact that you're looking at this page is *almost* proof that Hinton's proposition will interest you—*tremendously.*

You know Hinton, of course—of his history-making hop across the Atlantic in the NC-4; of his pioneering flight from North to South America; of his amazing expedition to the wilds of the Upper Amazon. But possibly you *don't know* that in addition to being one of the outstanding fliers of the age, he is also widely recognized as one of Aviation's greatest teachers—as a highly accomplished trainer of men. During the War, Hinton became one of the Navy's crack flying instructors—and since Commercial Aviation has come into its own, he has forged to the front once again as the coach and co-worker of those who want to "get into the game."

Learn Where You Are

No need to pass up the opportunity of a lifetime just because you haven't the time or money for several weeks or months at a school. No need to close your eyes to the great money-making possibilities of this most fascinating of all industries, just because you're tied down to a job. For the important, essential, basic facts that form the foundation for real success in any branch of Aviation—whether you propose to climb the skies or keep both feet right on the ground—Hinton can give you quickly, thoroughly, and inexpensively—*right at home.*



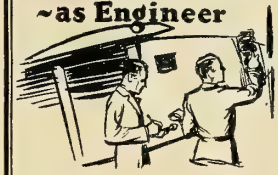
~as Pilot



~as Mechanic

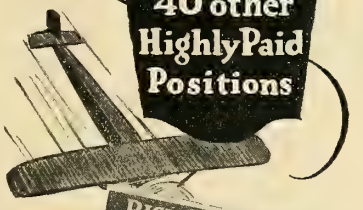


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For every pilot there must be ten to forty trained men on the ground. Think of the high-priced skilled workers needed—mechanics, electricians, welders, carpenters, pattern makers, draftsmen and a score of others—in the construction and servicing of a plane. Or consider the big money to be made by salesmen, instructors, demonstrators, private pilots, etc. In every corner of the land manufacturing, transport, air-port, service and sales organizations are springing up. Thousands of them! And they all have valuable openings. But no matter what you do—what branch you take up—you must FIRST know the basic facts, the underlying principles, the "rules of the game." To *get started right* in Aviation—to *grow* with Aviation—the practical, comprehensive, confidence-giving knowledge that Hinton can give you is just what you need.

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(*Continued from preceding page*)
Prior to the transfers, all pilots in the area were members of the 429th pursuit squadron, with headquarters at Lincoln, Nebr.

Every effort is being made by the Chamber of Commerce, flying clubs, and other organizations to get the government to furnish a supply of planes, and army instructors and ground men for the unit.

A NEW airplane manufacturing firm, to be known as the Knoll Aircraft Corp., and to produce large cabin planes, has been announced for Wichita.

Incorporators are: Felix W. A. Knoll, S. M. Thomas, W. E. Holmes, D. W. Eaton, and L. L. Morris, all of Wichita, and H. D. Wammer of Kansas City, Mo.

Mr. Knoll has designed the first ship to be produced, a six-place cabin biplane. Later, the company intends to manufacture large transport planes with a capacity of 20 to 30 passengers.

A SHORT-WAVE broadcasting and receiving radio station, for use in handling weather reports for air mail and commercial fliers, is being erected on the municipal airport at Wichita by the Department of Commerce. F. R. Robinson has been assigned as operator.

ON top of a new record in cash sales of $75,000 for the week ending October 7, the Travel Air Manufacturing Co. collected for and delivered Travel Air planes of a total value of $93,485 for the week ending October 14.

Neither of these two weeks are record weeks in number of planes delivered, but the cash value of the business denotes a strong tendency to more size and power, particularly the latter.

O. L. HARNED was recently appointed district sales manager for the New York area for the Travel Air Manufacturing Co. The company plans to district the entire country in a like manner, with a sales manager in charge of each district. For the past two years Mr. Harned has been at the head of the sales department, as it was formerly organized. Under the new plan, there will no longer be any general sales manager

In taking over the sales direction for the New York area, Mr. Harned will coöperate with Travel Air distributors in that territory among whom are: R. T. Aldrich, Albany, N. Y.; W. H. Emery, Jr., Bradford, Pa.; A. K. Owen, Reading, Pa.; T. B. Neelands, Roosevelt Field, Long Island; Boston Airport Corp, Boston, Mass.; Interstate Airways, Hartford, Conn.; W. A. Tipton, Baltimore, Md.; Continental Aero Corp., Montreal, Canada.

Ray W. Brown will be district sales manager for the central section of the United States.

CAMEL'S WOOL FOR ANTARCTIC EXPLORERS

FROM the Steppes of Tartary to the Antarctic is literally "from one end of the earth to the other". Yet such is briefly the story of the camel's wool parkas which Commander Byrd has taken on his expedition to the South Pole. The Bactrian camel, who travels from the torrid heat of Asiatic deserts to the piercing cold of the high mountain trails of Mongolia, is the bearer of this wool. In the camel's natural adaptation to these extremes in temperature lies the explanation of the thermostatic quality of coats made from his wool.

Commander Richard E. Byrd and Captain Sir George Hubert Wilkins selected camel's wool for their respective Antarctic trips because coats of this fabric have the warmth of furs with considerably less weight. Both expeditions are using camel's wool cloth made by the Worumbo Manufacturing Co., Lisbon Falls, Maine, and sold under the brand "Polo Blizzard Cloth".

The parka, a hooded shirt which pulls over the head and hangs to about knee length, was selected for the Byrd party. A complete parka weighs only 4½ pounds. Additional material is being carried to be made up on the trip southward. D. Siegel Company supplied Commander Byrd's parkas and the patterns from which the others will be made up.

Captain Wilkins and his associate, Captain Eielson, will be equipped with hooded great coats of camel's wool. These are designed particularly for comfort in flying. The explorers will also carry sleeping bags and knickerbockers of this material.

It is probable that certain of the air transport companies will avail themselves of these coats for the use of their passengers. In cases in which the transport companies require passengers to wear parachutes, the flexibility of the camel's hair cloth makes it easy to attach the leg straps through slots in the coat and still have comfort.

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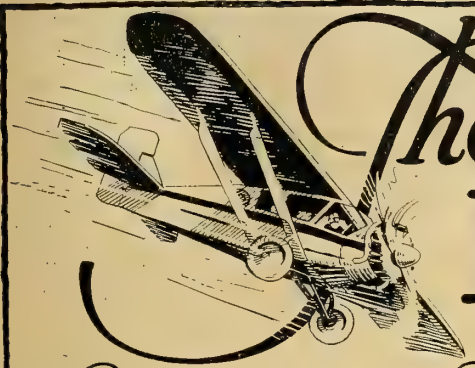
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KANSAS AIR NEWS

By E. B. Christopher

HUTCHINSON has decided to spend $8,000 for improvements on Albright field, the municipal airport. Albright field is a fine, level four-way field of 160 acres, located two miles southeast of the business section of Hutchinson. Hangars to accommodate four ships are on the field. The use of Albright field was donated to the city by Emerson Carey, salt magnate and pioneer of Hutchinson. Mr. and Mrs. W. E. Albright operate the field.

LARNED'S municipal airport is being operated by Merle Johnson.

THE new airport at Independence will be completed in the near future. It is a four-way field located five miles north of the city.

TOPEKA is considering the improving of the municipal airport and the leasing of additional ground to enlarge the present field. Topeka's present airport consists of a tract of 80 acres which lies just east of the highway five miles south of the city.

Roy Morris, who operates a flying field and school, reports an increasing number of students. Morris Field is five miles east of the State Capitol on the Topeka-Lawrence pavement.

In addition to flying instruction, Morris School of Aviation has a ground school located downtown where instruction on motors, welding and rebuilding is given every evening.

Dodge City Air Meet

McCOY FIELD, Dodge City's new airport, was opened on September 24 by one of the largest air meets ever held in western Kansas.

Wichita planes and Wichita pilots carried away most of the events. The first event was a 20-mile race for ships powered with motors of 100 h. p. or less. Carl Winstead of Wichita finished first in the OX-5 Travel Air, with Orville Vought of Plains, second in an Eaglerock.

The second event was a free-for-all race of 20 miles. Dyke Laudeman of Wichita was winner of this event, piloting his Hisso Travel Air over the triangular course in 11 minutes, 50 seconds. He was followed closely by his brother, James Laudeman of Hutchinson, flying Bert Schmitt's Travel Air monoplane. Carl Winstead of Wichita nosed Bob Townsend of Dodge City out of third place by a lead of only ten feet.

The third event on the program was a dead stick landing contest from an altitude of 1,000 feet. James Laudeman won this event, his ship stopping within 5 feet, 9 inches of the mark. Bob Townsend of Dodge City was second, Dyke Laudeman, third and Carl Winstead, fourth. All contestants in this event used OX-5 Travel Airs.

The program was concluded by a splendid display of stunting by Carl Winstead and Bob Townsend.

McCoy Field is owned by W. F. McCoy, Ford dealer of Dodge City. It contains 160 acres of level ground, high and naturally drained, and is only one mile and a quarter north of Dodge City. Two runways, each 300 feet wide and 2,640 feet long, have already been constructed. Two new hangars are already occupied, and Mr. McCoy will construct additional hangars as needed.

Judges of the events were: S. C. Clinesmith and Merle Johnson, Larned, Kans., Ted Braley and E. B. Christopher, Wichita, and Wm. Horn, Dodge City.

The opening of the field was sponsored by the Dodge City chapter of the N. A. A. The following Dodge City men helped make the opening a success: Carl Fay, Geo. Schuler, James McColm, Hiram Burr, Cliff Osborne, and Art Zimmer.

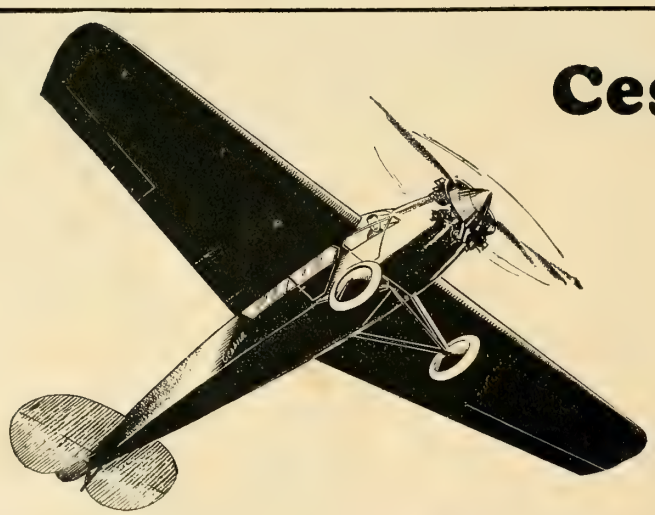
Newton Air Meet

DESPITE disagreeable weather, several thousand people witnessed a very interesting air meet at Newton on October 12. This was the main event on the closing day of the Newton Fair.

The first event was a 20-mile race over a triangular course for ships powered with motors of 100 h.p. or less. Ira McConaughey of Wichita came in first in his OX-5 Special Travel Air, covering the course in 10 minutes, 49 2-5 seconds. Carl Winstead of Wichita, OX-5 Travel Air, was second, his time being 12 minutes, 50 3-5 seconds; while James Laudeman of Hutchinson was third in 13 minutes, 41 1-5 seconds.

The second event was a dead stick landing contest from an altitude of 1,000 feet. Clarence Clark of Wichita was first, bringing his Travel Air within 14 feet, 9 inches

(*Continued on next page*)



Cessna Facts

The CESSNA means more speed, greater stability, easier handling, and above all, more comfort for four people, in its luxurious closed cabin.

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The National Air Races proved CESSNA SUPERIORITY—not only over any other cabin ship—but over ALL TYPES.

In Class A, Rowland won. In Class B, Schultz, in his Whirlwind powered Cessna, made the fastest time of any ship, open or closed, carrying a commercial license (or approved type certificate) issued by the U. S. Department of Commerce.

Advanced type of construction and engineering makes possible the tremendous speed of the CESSNA. Even with this great speed, however, the Cessna, with a Warner Scarab motor, has an average landing speed of only 42 m.p.h., with a pay load of 677 pounds, including pilot, and 45 gallons of gas and 5 gallons of oil,—an average of 3 tests made at Wichita, at an elevation of 1300 feet above sea level. With the J-5 Whirlwind, the CESSNA with the same load showed an average landing speed of only 48 m.p.h., on three tests.

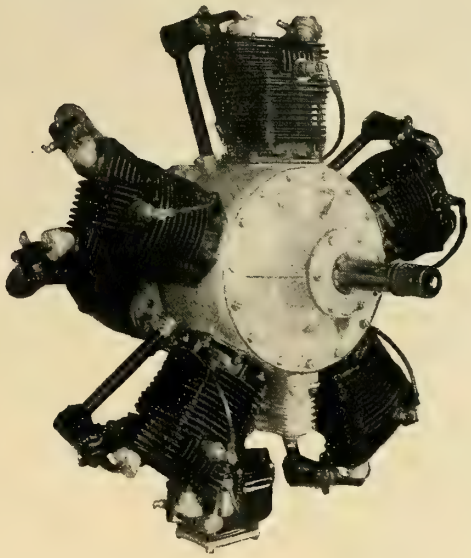
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VELIE M5
AIRCRAFT ENGINE

Smashes all Records for ECONOMY (with Dependability)



2300-mile Flight in 23½ Hours Made by the Monocoupe with Pilot and one passenger at a total cost of $24.50

This remarkable record for economy was established on September 3rd by Vern Roberts, test pilot, accompanied by Dr. (Scotty) Burmood, service man for Velie radial motors. This Monocoupe powered with the famous Velie M 5 aircraft engine flew from Moline, Illinois, to Los Angeles, California in 23 hours and 30 minutes.

Twenty-five miles per gallon of gasoline, totaling 90 gallons for the entire trip, at 25 cents per gallon, and two gallons of oil at $1.00, making a total cost of $24.50 for the entire trip, or $12.25 per passenger. Never before has the world known of such swift, economical transportation.

The sturdy Velie 5-cylinder radial aircraft engine is designed, engineered under the closest supervision, and manufactured to the highest standards of precision.

We invite inquiries from airplane manufacturers and others who would avail themselves of the opportunity to secure full details of this remarkable engineering achievement —the Velie M 5.

VELIE MOTORS CORPORATION, *Moline, Illinois*

"Ask the Pilot"

Long Life **VELIE** *OWNED AND OPERATED BY ITS FOUNDER ... 1908-1928 ...*

(*Continued from preceding page*)

of the mark. Carl Winstead of Wichita and James Laudeman of Hutchinson, also in Travel Airs, won second and third places.

The third event was a 20-mile free-for-all race. Ira McConaughey of Wichita again piloted his OX-5 Travel Air to victory, covering the course in 10 minutes, 49 1-5 seconds. Dyke Laudeman of Wichita, in a Hisso Travel Air, finished second in 10 minutes, 59 seconds, and Major Lord of Tulsa in a Whirlwind Stearman, third, covering the course in 11 minutes, 13 2-5 seconds.

McConaughey's speed for an OX-5 job is the fastest ever made in this section of the United States and was a surprise to all pilots as well as to spectators. The ship he flew was the first of a new two-place type recently produced by the Travel Air Co.

The last event on the program was a dead stick landing contest from an altitude of 2,000 feet. Clarence Clark of Wichita again demonstrated his skill by bringing his Travel Air to within 8 feet, 1 inch of the mark. James Laudeman came within 10 feet, 2 inches of the mark for second place, and Charles Lauders of Wichita in a Travel Air, 35 feet, 5 inches, for third money.

The meet was sponsored by the Newton Chapter of N. A. A. and the Newton Flying Club, and was the largest ever held in this section of the state. Arch Merriam and Norville Sifers, of Wichita, and B. H. Northcott and Carl Hay, of Newton, were the judges. Marcellus Murdock of the *Wichita Eagle* was announcer.

INDIANAPOLIS NEWS

By H. Gene Haynes

INDIANAPOLIS is ready to purchase a site for a $1,000,000 airport which will be one of the regular stops on the proposed air-rail line of the Transcontinental Air Transport, Inc.

The site which, in all probability, will be purchased is seven miles west of Monument Circle, the aviation guiding post of downtown Indianapolis, and embraces 920 acres. The land lies between the Pennsylvania and Big Four railroads on the old National road, the natural route from east to west over the city. The site is being offered for $473,800.

Another site embracing 636 acres on all sides of the present Mars Hill airport, home of the 113th observation squadron of the Indiana National Guard, is being offered for $440,200.

The third site consists of more than 1,000 acres. It lies about four miles west of the Monument, north of the National road. The price quoted is about $303 an acre.

The committee and Mayor Slack have pledged to support a municipal bond issue of approximately $500,000 to buy the land for the airport.

THE 113th observation squadron, operators of the Mars Hill airport, have received authority from the Indiana armory board to close options on 192 acres of land, which at present comprise the airport. This will be done in a few weeks unless the city decides to use the Mars Hill land as a nucleus for the municipal airport.

A NEW airport established in the northwest section of Indianapolis by the Capitol Airways, Inc., is to be known as the Lindyana Field, it has been announced by E. H. Jose, president. Several dignitaries, including Army and Air Corps officers, attended the opening. William H. Kershner, state adjutant general, was one of the speakers. An aerial circus was presented under the direction of Lieut. Walter R. Peck of Schoen Field, Fort Benjamin Harrison.

PLANS are under way to operate an emergency airport near Crawfordsville on the Indianapolis-Chicago air mail route, according to Edward M. Haight, of the post office department. Haight, who is making a survey to obtain a site, said that if the airline is followed, the airport would be established one mile southeast of Waynetown, Ind. Crawfordsville officials probably will buy the site.

N. A. PERRY, well known business man and a sportsman of Indianapolis, recently took delivery of the latest model Fairchild six-passenger cabin monoplane. This plane is the first of the five-passenger and pilot Fairchild planes which the Fairchild Company has put into production. Capt. H. Weir Cook is piloting the ship for Mr. Perry.



ALL BUT ONE
(69 out of 70)

National Air Race Winners
were HASKELITE-equipped

Race No. 1.	Class A	N. Y. to Los Angeles.	HASKELITE	users	ALL.	Marine observation race.	HASKELITE	users	ALL
Race No. 2.	Class B	" " " "	"	"	"	Army observation race.	"	"	"
Race No. 3.	Class C	" " " "	"	"	"	First pursuit group race.	"	"	"
Race No. 4.	Class A	S. F. to Los Angeles.	"	"	"	Two-place observation race.	"	"	"
Race No. 5.	Class B	Oakland to Los Angeles	"	"	"	Pursuit free-for-all race.	"	"	"
Race No. 6.	Closed Course Event		No. 2.	"	"	Navy pursuit race.	"	"	"
Race No. 7.	" " "		No. 3.	"	"	VB2B squadron race.	"	"	"
Race No. 8.	" " "		No. 4.	"	"	Third attack group race.	"	"	"
Race No. 9.	" " "		No. 5.	"	users ALL but 1.	Army service pilot race.	"	"	"

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Breaks all records *for economical transportation*

[Twenty-three Hundred Miles in Twenty-three Hours at $12.25 per Passenger]

On September 3rd, Vern Roberts, test pilot for Mono-Aircraft, Inc., accompanied by Dr. (Scotty) Burmood, service man for Velie radial motors, left Moline, Illinois, for Los Angeles in the Monocoupe. Their itinerary during three days totaled twenty-three hours and thirty minutes of flying and twenty-three hundred miles.

The Velie M5, air-cooled, radial, equipped with the new Stromberg carburetor, used ninety gallons of gasoline and two gallons of oil in this twenty-three hundred mile trip across desert and mountains.

Twenty-five miles per gallon of gasoline (less than four gallons of gasoline per hour) making ninety gallons of gasoline at 25c and 2 gallons of oil at $1.00, the entire trip cost $24.50 or $12.25 for each of the two passengers. This is undoubtedly the most economical form of transportation the world has ever known.

This Monocoupe, carrying the same contest load of the 510 cubic inch displacement planes, then placed in every Los Angeles contest, even in competition with motors of twice the horsepower and displacement.

Here is an airplane, a motor and carburetor with the most comprehensive 100% guarantee known to the industry.

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MONO-AIRCRAFT, *Inc.*

Makers of Monocoupe, Monoprep and Monocoach

MOLINE, ILL., U. S. A.

CHICAGO AIR NEWS

By Duke Jordan

THAT the aeronautical show here December 1 to 9 is going to be one of the greatest in the United States is indicated in that the demand for space has been so great that it was necessary to lease a second auditorium at the 131st Infantry Armory, Sixteenth Street and Michigan Avenue, near the Coliseum where the big show will be held.

More than 200 individual exhibitors have already applied for space.

OPERATING as a direct factory sales and service branch, the Fairchild Aviation Company's Chicago branch reports the sale of 16 Fairchild cabin monoplanes during the last six months.

Sales were made to Universal Airlines, Scenic Airways, Interstate Airlines, Michigan Air Transport, Wings, Inc., Shockley Flying Service and the Wadhams Oil Co.

The personnel of the Chicago branch includes E. W. Fuller, manager; A. B. Harris and L. R. Dolley, salesmen; E. G. Rhenstrom and R. W. Pears, pilots.

ELIAS R. CHRISTENSEN, of Tilden Technical High School, advocated before the Board of Education that classes in aeronautics for high school boys be established in ten of the local schools. Plans are already being made for the establishment of courses.

ARMOUR Institute of Technology has opened night classes in aviation for the third successive year. Instruction is given twice a week in theory, structure and rigging, aviation engines, navigation and aerology. Upon completion of the course in flight training, one may obtain a commission in the naval reserve. Those living in Chicago may by this means get the privilege of using the flying equipment at Great Lakes.

A CHART kept over a ten-month period by Lathrop Moss, Lake Forest flier, shows that he can operate his Swallow biplane, powered with an OX-5 motor, cheaper than he can his automobile. During the ten months he has owned the plane, it has cost Mr. Moss $1,472.25 to fly the ship over a distance of 14,875 miles. His automobile operating costs for the same distance amount to $1,784.

A SUPER-UNIVERSAL cabin plane powered by a Pratt and Whitney Wasp, the first to operate off the Chicago Municipal Airport, has been delivered to the Gray Goose Airlines. Captain Homer Berry, operations manager of the line, flew the ship here from Hasbrouck Heights, N. J., carrying Mr. and Mrs. M. C. Meigs, Donald Vale and J. T. McGiveran, Jr., as passengers. The Fokker will be used for chartered cross-country flights.

STUDENT flying at the Municipal Airport will be barred if recommendations of the Chicago Aero Commission are adopted in connection with a $500,000 improvement plan. The city council will decide whether the voters of the city will be asked to approve a bond issue to supply the money at the November election. Improvements planned for the southeast portion of the field include: administration and equipment building, $124,000; new runway, $30,000; drainage, $30,000; fencing, $10,000; planting and landscaping 100 acres, $8,000; beacon, $6,000. Members of the commission stated that ships must now circle the field from 15 to 20 minutes before being able to land

Captain Parker Joins Byrd

CAPTAIN ALTON N. PARKER, U. S. Marine Corps Reserve, sailed October 10 from San Pedro, California, with the last contingent of the Byrd Antarctic expedition.

As a student at the U. S. Navy school at Pensacola, Florida, Captain Parker first learned to fly in 1917. He was a member of Byrd's North Pole expedition and later piloted trimotor ships between Philadelphia and Washington. For the last year he has been in Chicago with Erwin, Wasey and Company, advertising agency, from whom he has obtained a leave of absence to accompany Byrd on his latest venture.

SOUTHTOWN AVIATION CLUB is sponsoring a benefit aviation ball which is to be held November 5 at the Trianon ballroom, 62nd Street and Cottage Grove Avenue. Proceeds of this ball will be used for the grading of runways and the purchase of a beacon light for Southtown Airport.

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Policies have been issued over a long period of years and, among others, in favor of Federal and State Governments, Boeing Air Transport, Pacific Air Transport, Colonial Air Transport, Colonial Western Airways, National Air Transport, Western Air Express, Robertson Aircraft Corp., Colorado Airways, Northwest Airways, Walter T. Varney, Inc., Southern Dusting Co., Philadelphia Rapid Transit, Stout Air Service, Boston Airport Corp., American Railway Express, Ford Motor Company, Fairchild Aerial Surveys, Fairchild Flying Corp., Pacific Marine Airways, Pitcairn Aviation, United Cigar Stores Co., Royal Typewriter Co., Hamilton Maxwell, Inc., Pulitzer and other race meetings, Universal Motion Picture Corp., Fox Film Corp., American Airports, Inc., Jefferson Airways Corp., Midplane Sales & Transit Co., Stinson Aircraft Corp., Thompson Aeronautical Corp., Atlantic Aircraft Corp., Pratt & Whitney, Caddo Co., Chas. Rogers Productions, Canadian Transcontinental Airways, Ltd., Western Canada Airways Ltd., S.C.A.D.T.A. of Colombia, S. A., Andian National Corp. of Colombia, S. A., Maddux Air Lines, Scenic Airways, Standard Oil Co. of Cal., Richfield Oil Co. of Cal., Trans-continental Air Transport, The Daniel Guggenheim Fund for the Promotion of Aeronautics, Gene Tunney, and many others including Col. Charles A. Lindbergh, Sir Hubert Wilkins, Anthony Fokker, and other leaders in aviation.

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Transport Fliers Will Train You

Chief Pilot Meyer (photo below), operator of Meyer Air Transport, supervises all instruction. He was a war time Army Flying Instructor—has taught flying over twelve years, training hundreds of cadets and civilians, with never one injured student. Assistant instructors are long experienced Transport fliers.



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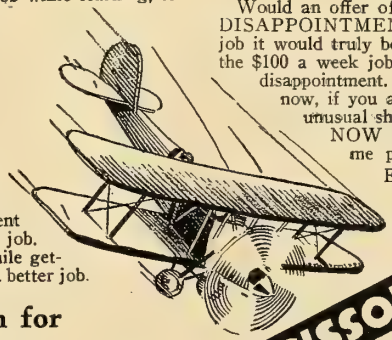
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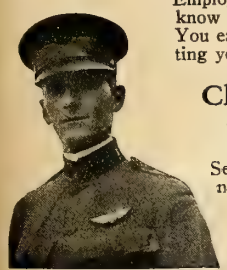
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IOWA AIR NEWS

By R. W. Morehead

PRESIDENT ERNEST BAETZ and Secretary Harry Kunsz, of the United States Junior Chamber of Commerce, made an inspection tour of the Bolte Aircraft Company's plant at Des Moines recently. They also conferred with school officials of the city in the interest of establishing courses in aviation in the senior year of the high school.

W. C. LORENZEN of Marshalltown has established the first airplane agency in that town. He has the Travel Air agency for three tiers of counties in Iowa between Marshall county and the Mississippi River.

Lorenzen will also give flying instruction and conduct an air taxi service.

THREE Iowa towns observed "Mark Iowa Week" by painting the names of their towns on high buildings for the guidance of aviators. They are Dinsdale, Zwingle and Harpers Ferry.

This brings the total of marked Iowa municipalities to seventy-six.

THE Council Bluffs airport was opened with dedication ceremonies on September 28 and 29.

Thirteen army planes from Selfridge Field, Ft. Riley, and Ft. Crook were present, and more than 10,000 persons were in attendance both days. The affair was the first large air circus to be held in southwestern Iowa.

WATERLOO held the largest air circus in its history the week of October 7, when the airport just east of the city was dedicated as Chapman Field in honor of Lieut. Carl Chapman, first American aviator to meet death in the world war.

Capt. Eddie V. Rickenbacker made the principal address at the ceremonies. John H. Livingston, winner in the recent transcontinental air derby from New York to Los Angeles, gave an exhibition of flying.

A THREE-DAY county jubilee celebration was held at Ames recently, with Wilford Gerbracht of that city taking first in the feature of the program, a twenty-mile race over a triangular course. Gerbracht's time in a Travel Air plane was 16 minutes and 50 seconds.

George Powers of Rockwell City, in a Lincoln Page plane, was second with 18 minutes and 32 seconds, and one of the Lorenzen brothers of Marshalltown, was third in 18 minutes and 46 seconds. Lorenzen also flew a Travel Air plane.

In the dead stick landing contest David Baker of Nevada, in a Travel Air, placed first when he brought his plane down only thirty-six feet from the center of the landing circle. Matt King of Gilbert was second, and Herman Banning, negro flier of Ames, was third. Baker placed first in the stunting contest, with Gerbracht second and George Powers third.

A guest of the occasion was Lieut. Guy McNeil, instructor in flying at Chanute field, Rantoul, Ill., and a former Ames boy. At the conclusion of an exhibition in his Army Curtiss observation plane, Lieut. McNeil was presented with a gold watch by a group of Ames aviation fans.

J. H. Ainsworth was in charge of the program.

DAVENPORT AIR NEWS

By Ralph W. Cram

DAVENPORT will dedicate an airport and stage a big aerial demonstration on Armistice Day. Promises of the participation of fourteen army and two navy planes have been received, and an even larger number of commercial planes are expected to take part.

The new airport will consist of 110 acres in the northwestern part of the city, only 3.6 miles from the post office. The Davenport Chamber of Commerce will erect a $10,000 hangar for free use of visiting pilots. The field is operated by the Iowa-Illinois Airways, Inc., of which L. M. Pedigo is president. The company has 46 students in its school, directed by Lieut. Robert Menick, who finished at Brooks and Kelly fields in the same class as Colonel Lindbergh. Leo Brennan is also on the staff of fliers. They have the agency for the American Eagle plane.

COCA-COLA came out of the air onto the local airport recently in the shape of the Stinson-Detroiter "Coca-Cola", piloted by Louis Stewart, with Ed Parmele of the Stinson Illinois-Indiana agency as a passenger. The plane is owned by T. Walter Fred of Chattanooga, Tenn.



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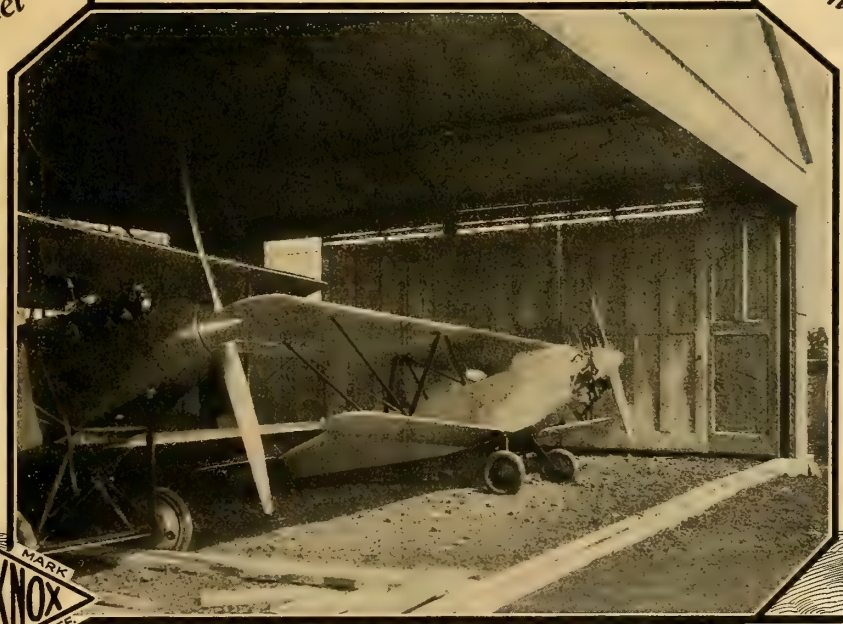
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MONTANA AIR NEWS

By C. T. Sullivan

THE Montana *Free Press,* a newspaper of Butte, instituted daily air mail service for readers in Helena, Cascade and Great Falls on October 15. Readers living in Great Falls, 130 air miles over the Continental divide from Butte, can buy the paper one hour and 30 minutes after it is off the press.

Pilots of the Butte Air Craft corporation take off with 300 pounds of papers at 3:30 and land at Helena shortly after 4. At Cascade the papers are dropped, and the main consignment of papers reaches Great Falls shortly before 5 p. m.

TWO Stearman planes, equipped with 220 horsepower Wright Whirlwind motors, have been added to the National Parks Airways, Inc., fleet of planes which carry the Great Falls to Salt Lake City air mail.

THE Vance Air Service of Great Falls plans to start a daily passenger plane service to Billings on November 1. Intermediate landings are planned at Lewistown, Roundup and Stanford. A Stinson-Detroiter will be used to inaugurate the line.

WISCONSIN AIR NEWS

By William Scollard

CARL HERZFELD, chairman of the Association of Commerce air service committee, has left for Europe, and while there, will make an inspection of European airports to gather ideas for the improvement of Milwaukee's aviation fields.

THE Northwest Airways celebrated its second birthday on October 2 with a record of continuous service between the Twin Cities, La Crosse and Chicago, without a serious accident to blemish its operations. Two years ago the company took over the air mail contract line with a personnel of nine employees and equipment totaling in value $39,000. Now it employs more than 30 persons, has equipment valued at $250,000 and does an annual gross business of approximately $300,000. Col. L. H. Brittin is vice president and general manager of the company.

FOURTEEN planes took part in the dedication of the Sheboygan Airport at that city on October 7. D. D. Griffin and John P. Wood performed a series of stunts during the day. Addresses were made by John Heronymus, president of the Sheboygan Junior Association of Commerce, Mayor Herman Schuelke and A. D. Bolens. The program was arranged by the J.A.C.

THE Beloit Airways, at Beloit, was purchased by the Midwest Air Transport Company, Madison, during the past month. Pilot Hatch, graduate flier of the Midwest air school, has been placed in charge of the Beloit field, and F. Gerald Phillips, chief pilot, is spending three days a week in Beloit to superintend student instructions.

The Midwest company is also taking charge of student instruction at the Richland Center Airport. This class is instructed by Mr. Phillips.

In addition to operating Madison Airport and providing a general flying service, the Midwest Air Transport Company is the Wisconsin agent for the Travel Air plane.

WEEKS AIRCRAFT CORPORATION of Milwaukee is completing final arrangements for the opening of its new ground school, which is to be offered in conjunction with its present course in flying instruction. Complete equipment has been purchased for this course, which includes technical lectures and actual shop work extending over a period of three months. H P. Whittle, who has had five years' experience in aviation with the Marine Corporation and four and a half years in commercial aviation schools, is director of education for Weeks Aircraft Corporation.

NORTH DAKOTA NEWS

By A. E. Riggle

DEDICATION of Legion Field, the municipal airport at Mott, was the outstanding event in aviation circles in North Dakota during October. A three-day air meet was staged, in which about 25 planes participated.

More than 3,000 persons attended the dedication proper, which took place October 3 Judge L. H. McCoy of Mott was in charge of the program. E. A. Kneedy, Watertown, S. D., gave the dedication address.

(*Continued on next page*)



Small field below!

When you're flying a Challenger, your next thought is of how easy you can sail into that little field with room to spare—at an amazingly slow speed too, if you want,—of how nicely she will climb up into the blue again after a short run. Control! That's one marked advantage of the sturdy Challenger 3-place biplane. That's one reason why the Challenger is so rapidly winning first preference with pilots wherever she sails the blue!

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   Steady work—continuing wages—low turnover—result in 60% of workers owning their own homes.
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   Within 24 hours of biggest buying population in Canada and United States.
6. **PLENTY OF POWER**
   At the very door of world's greatest source of power—Niagara.
7. **GATEWAY TO CANADA**
   75% of trade between United States and Canada moves through Buffalo - Niagara gateway.

ANY community, whose manufactured products exceed in value and in volume those of entire states, stamps itself "a great industrial state."

Buffalo is such a community center!

There are now more than thirty of our sovereign states, each of which produces less in manufactures than the Buffalo area.

One Billion Dollars scarcely measures the value of the goods annually made in the Buffalo Industrial District.

That industrialists appreciate the present advantages, and the future possibilities, of Buffalo and its environs is clearly evidenced by new plant investments exceeding Twenty Million Dollars in recent months.

Executives are invited to write for the "INDUSTRIAL ANALYSIS of Buffalo and the Niagara Industrial District."

Industrial Department
CHAMBER OF COMMERCE
BUFFALO, N. Y.



One of a series of advertisements regarding the industrial advantages of the Buffalo District.

(*Continued from preceding page*)

Bert Stevens of Hettinger, N. D., Clair Chaney of Grand Forks, and Thunder Johnson of St. Paul won first, second and third places respectively in the dead stick contest. Russell Riggs of Morris, Minn., E. M. Canfield of Fargo, and Thunder Johnson won first, second and third places respectively in a spot landing contest. E. M. Canfield of Fargo won the first place in a 75-mile cross-country air race to New England and back, which featured the first day of the program. R. D. Riggs was second, and Al Berglund of Grand Forks, third. Mr. Canfield won first place also in the 10-lap triangle race, the feature of the last day's program. Clair Chaney was second, and Russell Riggs, third.

A MODERN steel hangar is being constructed at the Port of Minot by the International Airways, Inc., of Minot. It will have a capacity for two transport ships and three smaller planes.

THE International Airways, Inc., and Northern Air Lines, Inc., both of Minot, operating lines on a daily schedule between Bismarck and Minot, were merged late in September and are now operating under the name of the International Airways, Inc. W. F. Noonan, general manager of the International Airways, Inc., continued as manager of the merged organization.

One airline to Bismarck was dropped. Lines to other cities probably will be established in the spring.

STEPS taken at the next term of the North Dakota legislature will have important bearing on airplane landing field developments in many cities in the state, a survey by commercial clubs indicates.

In many places, particularly the smaller ones, commercial clubs have leased fields for use as airports, but must await legislation to enable the city to buy the fields outright. Until that time many places are delaying improvement and equipment of their airports.

TWELVE airplanes participated in the air events attending the dedication of the municipal airport at Wahpeton in September. Murray A. Baldwin, president of the Fargo Aeronautic Club, gave the dedication address.

Grand Forks News

By Lloyd C. Tinnes

INCORPORATION of the Master Aeronautical Corporation has just been completed for the manufacture of the Master propellers, and the company is now equipping a new factory in Grand Forks for that purpose. The new company will also handle airplane accessories.

Officers of the corporation are: George B. Reynolds, president and general manager; Hubert Rueschenberg, vice president and treasurer, and Richard R. Hopkins, secretary. All the men are from Grand Forks.

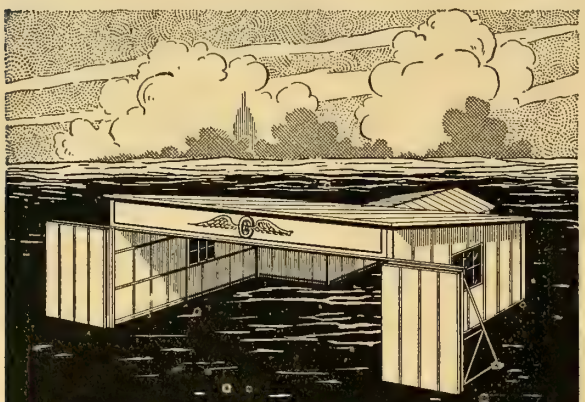
Only propellers for Travel Air planes have been made so far, but the concern will now branch out and build propellers for all types of engines.

A flying school also has been started by the Master Aeronautical Corp., at the Grand Forks municipal airport. Hubert Rueschenberg gives the flying instruction and G. B. Reynolds, the ground course.

Aerial Photography Aids in Combating Potato Crop Diseases

THE value of the airplane as an aid in photographic and inspection work for agricultural purposes was recently demonstrated by the Bayer-Semesan Company, Inc. In an effort to obtain a record of the extent to which various seed-borne diseases infest the potato crop in North Dakota and to show the efficacy of treating plants to combat such diseases, the Bayer-Semesan company made use of airplane photography. Because the plants conceal from view the vacant places caused by the disease, it was useless to attempt to film the fields from the ground so that the missing hills might be distinguished from the healthy plants.

A Travel Air biplane was therefore chartered from the Mid-Plane Sales and Transit Company, Inc. With Pilot Holbrook at the controls and a motion picture camera fastened down in the forward cockpit and operated by Henry Hesse, the ship was flown as high as 2,000 feet for long shots and as low as 200 feet for close-ups. By this means the contrast between treated and untreated sides of the field was clearly brought out, the treated part showing a complete stand and the untreated area showing many bare spaces.



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INDIVIDUAL
ALL-STEEL
HANGARS
FIRE PROOF LIGHTNING PROOF
EASILY ERECTED
STEEL BUILDINGS FOR EVERY PURPOSE

THE EDWARDS MANUFACTURING CO.
345-395 Eggleston Avenue, Cincinnati, Ohio



Ireland Flying Boats

The demand for flying boats for use by commuting sportsmen and sightseeing operators has caused us to devote our entire production facilities during the balance of this year to aircraft of this type.

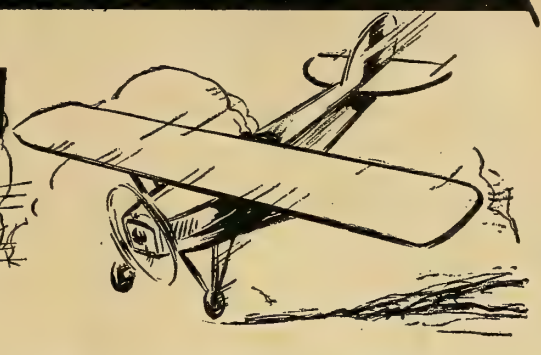
Practically the same ship as the successful Ireland Amphibian but with certain improvements which puts the Ireland Flying Boat in a class all by itself. Of course powered with the dependable Wright Whirlwind. Seats five.

Write for complete details

IRELAND AIRCRAFT, Inc.
Curtiss Field, Garden City, N. Y.

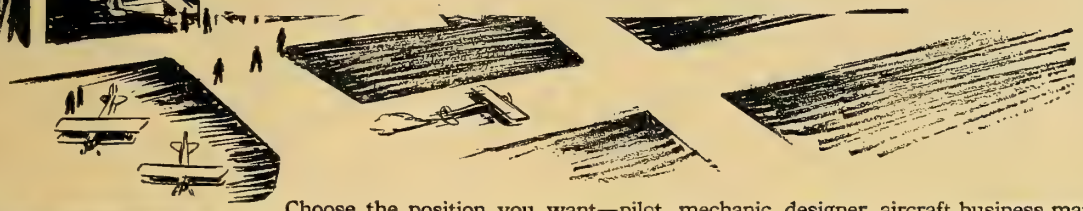
Say you saw it in AERO DIGEST

AVIATION has a Place for YOU





New Training Equips You For the Position You Want!





This student obtained a good position with an airplane company after graduating from Marshall Flying School. Superior training helps the student into such positions.

Choose the position you want—pilot, mechanic, designer, aircraft business man, field superintendent, airport manager, aircraft manufacturer—countless big positions are open for the trained man in every line of aviation. Take the training that will equip you for any one of those positions—get the newest features of aeronautical training at the College of the Air. * * * The "jack of all trades" has no place in aviation—masters are wanted. You need a specialized training. Marshall Flying School has new courses, new equipment and new methods of instruction to give you the help you need; all courses are offered now.

Complete Aviation Course Now Only $245.00. This course which gives you all the principles of flying and every needed requisite to make you a successful flyer, has been reduced within the reach of every young man. This course will be the big step you want to take to start into the aeronautical field—the field of so many opportunities. Decide today to commence your new career by enrolling for this course.

Mail the coupon below and get the free catalog which explains and describes the new courses and tells you how you can find your way into this promising industry.



After taking the training at Marshall Flying School, this graduate is thoroughly trained for this important manufacturing work in an airplane plant.

Straight Flying Course—Regular flying instruction including the fundamentals and requisites of ordinary flying. Price (without ground course) $75.00

Primary Flying Course—Work in Straight Flying Course and advances students to crosswind landings and take-offs and difficulties encountered in flying in all sorts of conditions. Price, including Mechanic's and Engineer's Ground Course $150.00

Intermediate Flying Course—Instruction given in both Straight Flying and Primary Flying Courses and advances student through full 10 hours of work in the air. Student can be soloed if ability is shown. Price, including Mechanic's and Engineer's Ground Course $200.00

Complete Aviation Course—All principles of flying and every needed requisite to make you a successful flyer. Forced landings, cross country and all-weather flying. Solo flying guaranteed. No bond required. Price, including Mechanic's and Engineer's Ground Course $245.00

Private Pilot's License Course—Flying time and training for a private pilot's license. Training qualifies you for eligibility for license. Ten hours of solo flight. Arrange your examination at field. No bond required. Price, after solo $150.00

Limited Commercial Course—Special advance course. Qualifies you under the Department of Commerce for the Government Limited Commercial Pilot's License. Get the Primary Flying Course and 50-Hour Advance Course. Price, including Mechanic's and Engineer's Ground Course $700.00

Mechanic's and Engineer's Ground Course—Especially to prepare for mechanics, ground and factory work. Also beneficial to contemplated flyers. Course includes metal airplane construction, repair and maintenance; motor assembly and overhaul; steel fuselage construction and repair; aerial mapping, meteorology, navigation, instrument reading, and theory of flight. Undoubtedly the finest ground course in the country. Plenty of equipment. 300 hours training. Price $75.00

This course is given free with all our flying courses with exception of the Straight Flying Course.

Special 50-Hour Course. Price, including Ground Course, $600.00.



One morning class of students grouped under the mammouth wings of a visiting tri-motor plane.

NEW CATALOG FREE!

Mail this coupon for the new catalog which shows you the equipment, buildings and the many training planes used at our school—explains all about the new courses—tells how you can make your start and win your way.



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Gentlemen: Please send me without obligation your new catalog and information on your new courses and new methods of instruction.

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Address _____

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- ☐ *Mechanic*
- ☐ *Designer*
- ☐ *Aircraft Business*

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THE RUSSELL MFG. CO.
349 Broadway New York City

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COLOMBIAN AIRWAY SYSTEM
Regularly operated since 1921
Saves 10 days from seaports to Central & Western Colombia
Air Mail, Parcel Post and Passengers carried between all cities in Colombia. Starting from Barranquilla planes operate daily except Sundays to the Interior and on regular schedule to Buenaventura on the West Coast, connecting with all United Fruit Steamers.
New Service to Ecuador
New additional fortnightly service starting August 11th from Barranquilla via Buenaventura and intermediate ports to Guayaquil, Ecuador.
Colombian Air Mail Stamps and Passage Reservation at
Interamerican Aerotravel & Supplies, Inc.
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Distributor proposition for parties with airport facilities and funds to handle sale of Laird Commercial planes

LAIRD CHICAGO PLANES

for a territory. Not connected in any way with any other manufacturer of airplanes.

E. M. LAIRD AIRPLANE COMPANY
1500 West 83rd Street Chicago, Illinois

AIR MAIL INCREASES

SEPTEMBER produced an increase in air mail poundage amounting to 4,944 pounds.

The total poundage of air mail carried in September was 423,991 as compared with 419,047 in August, an increase of approximately 5,000 pounds.

During August 740,359 miles of service were scheduled and 731,714 miles actually flown. Similar figures are not yet available for September.

STAR ALTITUDE CURVES

By Lt. Com. P. V. H. Weems

STAR altitude curves represent a new idea entirely to the method of position finding in the air. The author, Lt. Commander P. V. H. Weems, U. S. Navy, has striven with success to attain the speed and simplicity required by the conditions imposed on the air navigator. At the same time, sufficient accuracy for practical purposes in the air is assured.

Without going into the technical features of the construction of the curves, it may be said that the observer's position (the "line of position") for the latitude and local time of the observer is laid down for each altitude of the chosen star. The altitude curves for two stars are drawn on the same page, with the result that the intersection of the observed altitudes of the two stars used gives at once the latitude and the local star time. A special watch, called the Aero-Chronometer, also invented by Commander Weems, provides the Greenwich star time to the exact second. The local time combined with the watch time gives the longitude.

The remarkable thing about this method is the fact that the usual tedious corrections for altitude and for time are completely avoided. The sextant reading without correction is used on the curves, while the watch reading without correction is the Greenwich star time.

The speed of a position in two minutes is easily attained. The accuracy of the curves, using the proper altitudes, should be within three miles at all times, the worst condition being for the year 1928 as the curves were made for 1931 to allow for the slight change in the positions of the stars used.

These curves should prove popular with airmen, who wish to attain practical results by celestial navigation. The curves for the United States, less southern Florida, are bound in one neat volume.

It was largely the use of these curves which attracted the attention of Lincoln Ellsworth (to whom the book is dedicated), Colonel Lindbergh, and Commander Byrd.

MERIT TROPHY AWARD TO COL. ART GOEBEL

THE Merit Trophy and purse for $250 posted by Barber & Baldwin, Inc., aviation insurance underwriters, in connection with last month's National Air Races at Los Angeles has been awarded to Art Goebel, Dole Racing flier and record-holder for his Los Angeles to New York flight.

CLUBS

JOIN! BROOKLYN AERO CLUB, Inc.
An opportunity for a limited number of men and women to join the foremost active Flying Club in the East.
FLYING DAILY AT CURTISS FIELD.
Meetings held every Tuesday evening at Club Rooms. Write for details or call at
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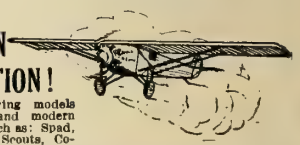
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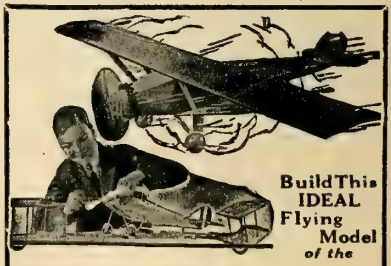
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is permanently on display and prepared for demonstration at the Newark Municipal Airport.
Our maintenance department is at your disposal for service, parts, instruction, and cross country flying.
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Build flying models of war and modern planes such as: Spad, Nieuport Scouts, Columbia, Junkers Bremen, Lindbergh's, Universal Fokker, etc. Our large catalogue illustrates 26 models and a most complete line of supplies and accessories for the model builders. Send 10 cents for your copy.
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Build This IDEAL Flying Model of the
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A PERFECT 3-ft. miniature of the most famous Airplane in the world! Anybody can build and fly it. The IDEAL Complete Construction Outfit contains everything needed; all parts, fittings and materials, full plans, diagrams and instructions. The Model is guaranteed to fly when correctly built. COMPLETE CONSTRUCTION OUTFIT **$7.50**
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Complete, accurate, one-half size Plans, with Building Flying instructions, for any one of the following: New York-Paris; FOKKER; Curtiss; DeHAVILLAND; NC-4 Seaplane; Bleriot; Taube or Nieuport; Cecil Peoli . . . . *EACH* **25c**
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—TAKING FIRST PRIZES IN THE SEASONS MAJOR EVENTS

Winning Sweepstakes with best time from New York to Los Angeles.

Placing first in Transcontinental Air Derby, Whirlwind Class, New York to Los Angeles.

Winning the International Race from Windsor, Canada, to Los Angeles.

First in National Air Tour by a margin of nearly 3,000 points.

Again demonstrating the same quality of performance which in the last seven years has been responsible for Waco's leading position in the industry.

The Sport Waco will be shown at the International Aeronautical Exposition, Chicago, December 1st to 9th

WACO AIRPLANES

The Advance Aircraft Co.

Troy, Ohio

HASKELITE PLYWOOD AT THE AIR RACES

THE widespread use of plywood in airplane construction was clearly shown at the National Air Races and Exposition in Los Angeles. Of the 45 airplanes on exhibition in the Exposition Building, 41 were plywood-equipped. Haskelite blood albumen glued plywood was used in the construction of 31 of the planes.

Among the airplane manufacturing companies exhibiting planes wholly or partially constructed of Haskelite plywood were: The Douglas Company, two planes; Travel Air Manufacturing Company, Inc., four planes; American Eagle Aircraft Corp., three planes; and the Mohawk Aircraft Company. The Mohawk exhibit included a wing section, showing how plywood is employed in its construction.

Other users of Haskelite plywood who exhibited were: O. E. Szekely, Stinson Corporation, Essig Aero Adv. Service, Golden Eagle Company, Boeing Company, Mahoney Corporation, Alexander Industries, Lockheed Corporation, Star Company, Crown Carriage Company, Chance Vought, Bach Corporation, Advance Corporation, Curtiss Robertson, Thunderbird Company, Jos. Kreutzer Corporation, Fairchild Manufacturing Co., Buhl Corporation, and Fokker Corporation.

At the air races, all the prizes (except one) in the transcontinental races, the closed course events, and the army and navy races went to Haskelite-equipped planes.

HEYWOOD STARTER ADDS SAFETY TO AIR TRAVEL

THE Heywood self-starter for aircraft motors has done much to eliminate risk to pilots and passengers. Fatalities due to starting motors by means of swinging the propeller are now a thing of the past. Modern aircraft are equipped with starters which permit instant starting by simply pulling the starter trigger on the dash.

Pilots and passengers and even student pilots no longer fear the motor going dead in mid-air, for in a twinkling a new start is assured by touching the button. Simultaneous with pulling the starter trigger, compressed air forces a carbureted mixture into each cylinder in firing order with sufficient pressure to turn the motor over, causing positive ignition and consequent starting.

AIR MAIL SERVICE DIVISIONS

WITH the purpose of maintaining closer supervision over the operation of air mail routes, the Air Mail Service throughout the country was recently divided into divisions corresponding as nearly as practicable to the fifteen Railway Mail Service Divisions. Under this arrangement, the division superintendents of the railways mail service, through their chief clerks, will make inspections of the mail service over the air routes. The duties of these officials, however, will not extend to the actual flying of mails, but will have to do with the routing, dispatch, handling and distribution of them. This plan results from the growth of air mail service to such proportions that it was found impossible to handle it with the original official force.

EQUIPMENT

Northeaster
FLYING TOGS



HELMETS
GOGGLES
FLYING SUITS

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HOME STUDY COURSES IN
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Affiliated with T. C. Ryan Flying School

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HOME STUDY COURSE $15
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OFFICE: HANGAR NO. 6, LOVE FIELD, DALLAS, TEX.

Splendid licensed equipment and plenty of it; expert instructors, low prices. Excellent living conditions on the field at reasonable cost. Under management with ten years' experience in all branches of aeronautics. Our shops, busy with assembling, overhauling and rebuilding of motors and airplanes, offer unexcelled opportunities for thorough ground course. Full cost of Home Study course is credited on Flying course.

PREPARE FOR A BIG JOB IN AVIATION
FORTUNES IN THE SKIES—LET US HELP YOU RISE

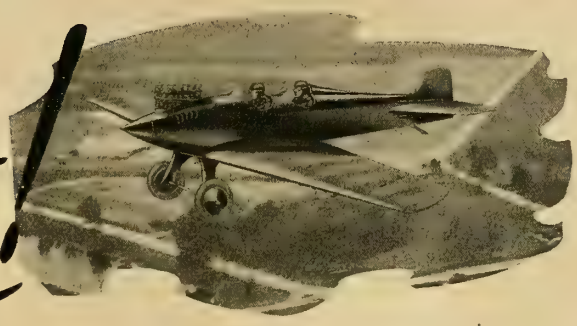
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An Airplane for Everybody!

GUARDIAN *Lightplane Solves the Problem!*

THOUSANDS of Americans have wanted an airplane that was economical, practical, safe. A ship that would bring flying down to everybody!!

Here it is! The Guardian Lightplane has been developed by an American Aeronautical Engineer from one of the most famous and successful lightplanes in Europe. This famous engineer was for four years with one of the largest factories in America. He has a record of eight years' designing, building, and flying success behind that! He has taken a successful European lightplane and developed it for *American* needs.

The Guardian is rugged, powerful, safe. Its design is simplified. It has a safety factor of 8! It is the simplest and lowest-powered practical airplane in America.

BUILD IT YOURSELF!

It has been especially designed so it can be built by any mechanically inclined young man who will follow the instructions and plans furnished.

Think of building an airplane yourself—from easy-to-understand plans prepared by a graduate aeronautical engineer with 12 years' experience! Think of equipping this with a low powered engine and flying it yourself! Think of an airplane strong enough for stunting, with a ceiling of over 10,000 feet, a speed of over 80 miles an hour—that you can build yourself for only a few hundred dollars!

Complete Plans $5.00

We want a thousand Guardians built and flying by spring. Spend the next month or so constructing one! It's easy! Send $5.00 *today* for a complete set of working drawings showing all details and dimensions of this practical two-seater lightplane, together with full instructions for building it, a recommended list of the kinds and types of motors you can get cheaply to install in it, and suggestions as to obtaining 50 to 200 hours flying time for a Commercial or Transport license.

You can build it in a few weeks at home with a few simple tools. The Guardian has a modern steel tube fuselage and simple, strong fittings especially designed for the amateur builder. You can build a Guardian complete, and get in enough flying time for a license, for a small fraction of the cost of attending a flying school! Send $5.00 *now* for a complete set of plans and all particulars, and get started before your friends beat you to it! Satisfaction guaranteed!

Send Your Order Today!

GUARDIAN AIRCRAFT COMPANY

1567 ARCADE BLDG. ST. LOUIS, MO.

SPECIFICATIONS

Span: 28 feet.

Length: 19 feet.

Weight Empty: 400 lbs.

Top Speed: 85 m.p.h.

Landing Speed: 32 m.p.h.

Capacity: Pilot and Passenger.

Type: Monoplane.

Power: As a single-seater, 20 H. P. As a 2-seater, 35-40 H. P.

Get Started Now!

Now is the time to get started building. You can put in time for a Commercial License, have hours of fun and sport flying yourself and carrying your friends. You can fly cross-country and make money in aviation.

Be the first in your district to build and fly this sensational monoplane. *For the first purchaser of plans in each town* we have a special offer to represent us with a discount on all later plans, parts, and supplies sold to other builders. Send your order today and get your ship in the air in time to make big money on this flood of Lightplane business that is beginning to sweep the country. Mail your order at once!

Guardian Aircraft Co.
1567 Arcade Bldg.
St. Louis, Mo.

I enclose $5. Please send me postpaid a complete set of working drawings of the Guardian Lightplane, building instructions, and other material and suggestions as advertised in AERO DIGEST.

Name .....

Address .....

.....

Say you saw it in AERO DIGEST

FOREIGN AERONAUTICAL NEWS IN BRIEF

Compiled from the foreign aeronautical press, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

International Aeronautical Exposition at Berlin

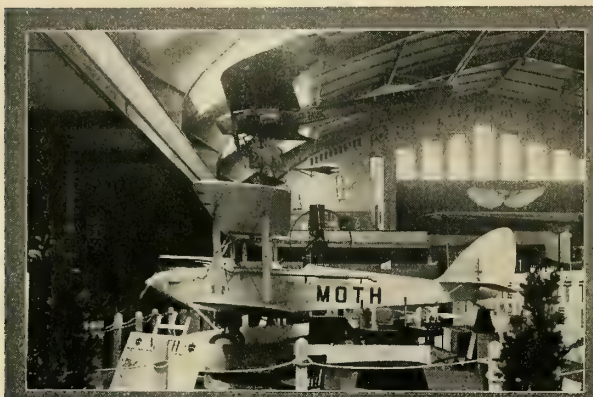
By Dr. Carl Hanns Pollog

THE second important aeronautical exposition in Germany, the Internationale Luftfahrt-Ausstellung (I. L. A.), opened its doors at Berlin on October 8th. (The first I. L. A. was held at Frankfurt in 1909.)

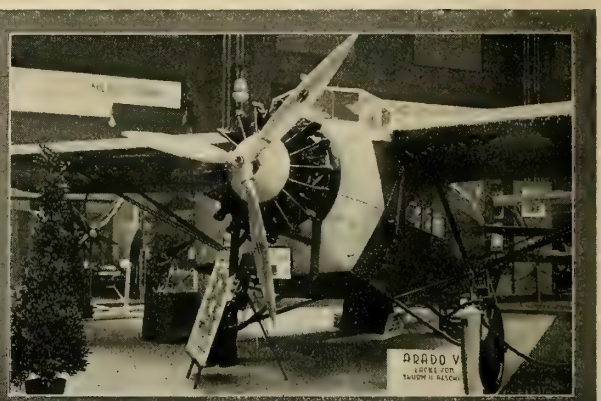
Three large halls of the magnificent exhibition grounds of the Berlin Municipality near the Kaiserdamm, comprising a floor area of more than 300,000 square feet, are devoted to a really international aeronautical show, in which twenty countries are represented. The majority of the exhibits are, of course, furnished by Germany, whose show comprises the whole of Halls 1 and 3 and a portion of Hall 2.

The entrance of Hall 1 is appropriately flanked by busts of the German pioneers of aviation, Gustav Lilienthal and Count Zeppelin. This hall is the domain of the

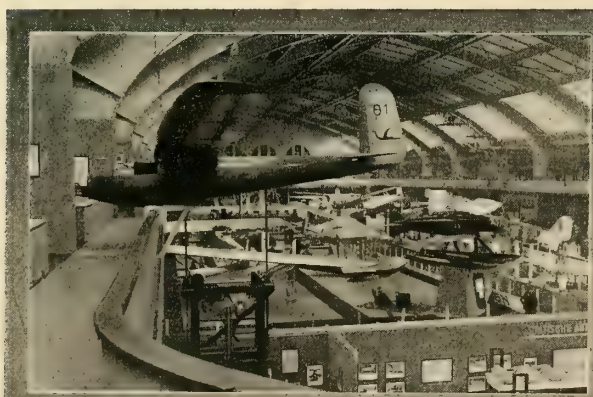
A FEW OF THE AIRPLANE EXHIBITS AT THE BERLIN INTERNATIONAL AERO SHOW



The D. H. "Gipsy Moth". A Rumpler Taube above it



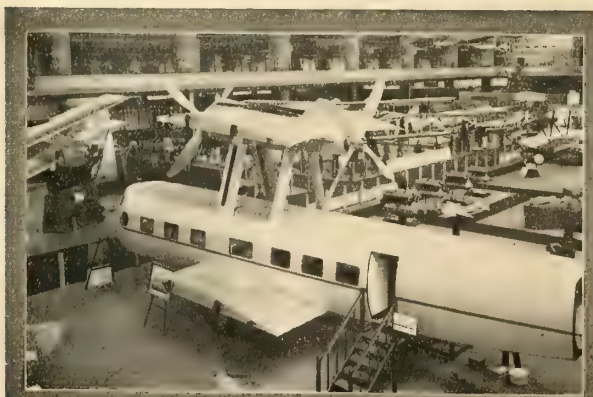
Arado (Pratt & Whitney engine; Standard Steel propeller)



The Darmstadt glider and a general view of the show



Heinkel H. E. 10 seaplane. Albatros in background



Center section of the giant Farman biplane



The Rohrbach Romar fitted with 3 engines of 800 h.p.

German industry. Of the engines shown, the most interesting are the B.M.W.VI (Bayrische Motorenwerke), a twelve-cylinder Daimler-Benz motor, the Junkers L.55 engine, which is a perfection of the L.5 of *Bremen* fame, and a collection of the engines of Siemens and Halske, one of which, the Ryan-Siemens, is well known in the United States.

The display of German ships is divided into the two sections, light and sporting planes, and passenger ships. In the first section there are represented the four manufacturers best known throughout Germany: Bäumer of Hamburg, with his "Sausewind"; Raab-Katzenstein of Kassel, with several types; Klemm, with his Daimler-powered light plane which is now being built under license in the United States; and Herr Espenlaub, who constructed a very successful glider during his apprenticeship as a carpenter and who is now building light planes.

Among the commercial plane exhibits are some interesting new types: the Focke-Wulf A.17, a "Möwe", the all-metal B.F.W. M.-20, and especially the large flying boat Rohrbach Romar, which shortly underwent some test flights over the Baltic Sea. It is reported that this plane will be used by the Deutsche Luft-Hansa on a route to South America. The other ships shown are those one can see daily on the airdromes. Two of them attract the largest number of spectators: Rohrbach Romar's great rival, the Dornier Superwal, and especially the giant Junkers G.31, *Hermann Köhl,* the biggest landplane on service. Mention may be made also of the Albatros L.73 biplane (called "sleeping-car plane" in Germany, because its seats may be transformed into couches), of the Heinkel ships and of the Junkers F.13. Junkers also shows in a very interesting manner the assembling of the F.13 and an exhibition of his laboratory shop. A number of manufacturers exhibit flying equipment and airplane accessories.

(*Continued on next page*)

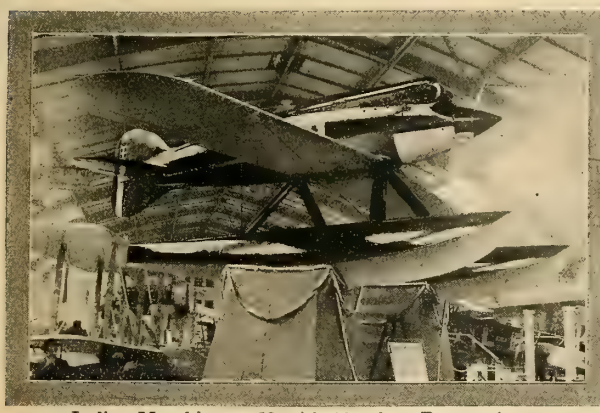
VIEWS AT THE BERLIN INTERNATIONAL AERO EXHIBITION HELD IN OCTOBER, 1928



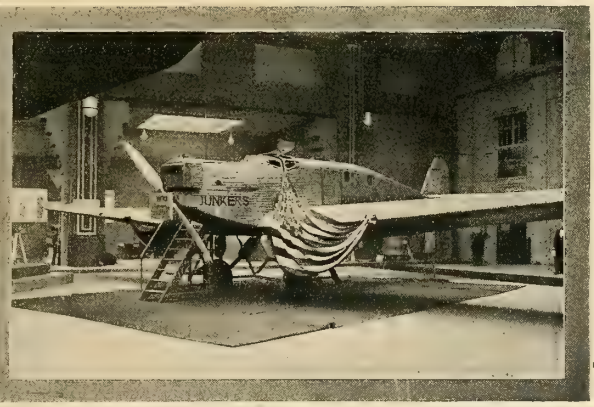
The Italian section of the exhibition hall



Russian air mail plane with 400 h.p. Aviatruss engine



Italian Macchi type 52 with 1000 h.p. Fiat engine



The Junkers W33 monoplane which new to America



Aero A.23 with Walter-Jupiter 420 h.p. engine



The Baumer "Sausewind" with Wright "Gale" engine

(*Continued from preceding page*)
so that Hall 1 gives a very comprehensive survey of the German aviation industry.

Hall 3 supplies a similar survey of commercial aviation. The German Aerial Police (the airdrome police who regulate and supervise the air traffic), the Deutsche Verkehrsfliegerschule (German Commercial Flying School), and the Deutsche Luft-Hansa, the great German aviation company, give details on the plan and scope of their respective organizations. A number of municipalities exhibit models of their airdromes, and there is also a collection of airdrome and meteorological equipment and instruments.

Hall 2 houses the exhibits of the foreign nations. Nineteen countries are represented here—not all of them, of course, in the same measure of comprehensiveness. It is especially to be regretted that the United States and Holland are not represented more in proportion to their importance in the international air traffic and aviation industry. England shows a number of interesting aviation engines, among them an air-cooled engine with the cylinders in rows, so that it bears some resemblance to a water-cooled engine. England also exhibits a DeHavilland Moth with slotted and folding wings. In the Italian section there is a recently completed 1,000 h.p. engine. France shows a giant Farman airliner, the so-called "flying-bar", so named because there is a bar counter in this machine. In the same hall there is the booth of the Deutsche Versuchsanstalt fur Luftfahrt (German Aviation Experimental Station).

The gallery of Hall 2 is devoted to an historical show which goes back to the times of Alexander the Great and his flying throne borne by four hungry griffins. In pictures and models it brings the most interesting flying experiments of ancient and medieval times. Here are shown the glider wings of Lilienthal, the plane first flown by the Wright brothers at Johannisthal near Berlin, the Grade airplane and the Rumpler Taube, perhaps the most successful German ship of pre-war times. To this section also should belong two planes which are placed in the French and Junkers sections respectively: the Bleriot biplane, *Nungesser and Coli*, of the world flight of Costes and Lebrix, and the Junkers W.33 *Bremen*, the transatlantic ship which has been transported here before being definitely exhibited in a New York museum. A wreath of laurels is placed before it, which circles the photos of Köhl, Fitzmaurice and Von Hünefeld.

The 1928 I. L. A. comprises for the first time in the history of aviation no military or naval planes, but only sport and commercial ships, for Germany is not allowed to build or use military airplanes.

GERMANY

NEW WORLD'S ALTITUDE RECORDS

NEW world's records for altitude have just been established by a Junkers plane fitted with a Bristol Jupiter Series VII, supercharged, radial air-cooled engine. Carrying 1,000 kgs. of useful load, the machine reached an altitude of 7,907 metres (25,941 feet) and with 500 kgs. of useful load, a height of 9,190 metres (30,150 feet). These exceed the previous records by not less than 1,121 metres in the first case and by 637 metres in the second case. Reginald Schinzinger piloted the plane on these record flights. These figures have received the official confirmation of the F. A. I.

CANADA

NEWS FROM CANADA

By C. P. C. Downman

CANADA was linked with the United States by air on October 1, by the arrival of an official air mail plane at the St. Hubert airport, Montreal, from Albany, N. Y., thus inaugurating the first international airplane mail service on the continent.

MERGER of three of the largest airways enterprises in the eastern provinces is reported from Toronto. The combination, to be known as Interprovincial Airways, Ltd., will be composed of Canadian Air Express, Ltd., International Airways, Ltd., and Canadian Airways, Ltd.

Air mail and passenger services between Quebec and Ontario cities and into Northern Ontario will be operated by the new company, of which Major General J. H. MacBrien, of Hamilton, head of International Airways, will be general manager. A. M. Bilsky and W. R. P. Parker, both mining executives interested in Canadian Air Express, will be directors.

(*Continued on next page*)

EDO FLOAT EQUIPMENT FOR SEAPLANES

THIS photograph shows the long wing Eaglerock equipped with EDO FLOATS and OX-5 engine running on step before take-off. EDO FLOATS have been installed on fourteen different types of airplanes, opening new markets for manufacturers and widening their field of usefulness for owners.



EDO float equipment is easy to install, and is supplied with all the attachment struts, wires and fittings complete to the last cotter pin. All the owner has to do is to hoist the machine, remove the landing gear and slip float gear in its place. The conversion usually takes from two to four hours. This easy interchangeability of float and landing gear makes the machine doubly useful to the owner, who can use it over water or land as the occasion demands.

EDO FLOATS are built entirely of metal. They do not soak water, and the seaplane can be kept moored at some yacht club or near one's summer home, just like a motor boat. No long trips to distant flying fields, no crew to take ship out of hangar. Just row to it, leave the boat at the buoy, crank the engine and off you go.

EDO AIRCRAFT CORPORATION
College Point, Long Island, N. Y.

STANDARDIZED ALL METAL SEAPLANE FLOATS

Say you saw it in AERO DIGEST

WINTER KING
FLYING SUITS
Built for Warmth

Luxurious flying suits made of the finest materials available, tailored by master craftsmen to the tastes and requirements of the flying fraternity, and at remarkably low prices not to be equalled elsewhere.



Face Mask

For zero weather flying.

Newest and most up-to-date protection for winter flying. Completely lined with beaver wool fur. Very warm. $7.50

$29.50

Entirely lined with warm wool felt.

$35.00

Lined with best grade virgin wool.

$39.50

Lined with heavy yellow sheepswool.

$49.50

Lined with the luxurious long nap Peruvian Alpaca wool. A revelation in lightness and warmth.



All Sizes from 36 to 46

Read these specifications and compare

Genuine gabardine khaki cloth; patent non-loosening belt buckle; separate fly flap; all points of tear are bar-tacked; legs cut wide—easy to put on and take off; genuine Wombat shearling fur collar 5" high; new style non-creeping Hookless fasteners; two large breast pockets; adjustable wrist straps; two convenient knee pockets and also two hip pockets; Hookless fasteners at leg bottoms.

An exceptional money making proposition for dealers, schools and salesmen.

Write for offer.

AIR TRANSPORT EQUIPMENT, Inc.

Curtiss Field, Hangar 20-A
Garden City, N. Y.

Address wires via Hempstead

Phone: Garden City 6666

(*Continued from preceding page*)

THE Canada Airways Company has been awarded the contract for the daily (except Sunday) aerial mail between Montreal and Toronto. The contract amounts to $205,000 per year or at the rate of $1 per flying mile.

The new contract replaces one with the same company for four trips per week between these points during navigation season.

DUE to the increase in Canadian aviation activity, Fairchild planes, which have been manufactured under license in Canada, will now be built in their own factory. The capital stock of Fairchild Aviation will be increased, a new factory and flying field built, and a complete line of land and seaplanes, from small two-seaters to multi-motored transports, carried. The aviation services of the company will also be expanded.

WORK on the creation of a modern air harbor for seaplanes for Montreal, with the provision of Customs and Immigration buildings and all necessary equipment, will be started immediately in the vicinity of Canadian Vickers, Ltd., Maisonneuve.

The new air harbor will be near the former location, operated by Canadian Vickers as a mooring area for visiting flying boats and seaplanes, though it will be more approachable by the general public. It will be on the north shore of the St. Lawrence, south of the buildings that house the firm's shipbuilding and aircraft manufacturing plants.

Two breakwaters 300 feet in length will be built out into the river to provide comparatively calm waters for mooring machines, and two floating platforms will be installed to enable aviators, passengers or other interested parties to embark or land from the respective planes. The air harbor will be completely lighted for night flying.

Western Canada Air News

By C. D. McCabe

THE first passenger and express air service between Winnipeg and Western Canada was begun September 18, with a trail trip to Regina, Moose Jaw, and Calgary. The super DeHavilland, eight-passenger cabin biplane, powered by a 460 horsepower Bristol Jupiter engine, was piloted by W. L. Brintwell, flying for the Western Canada Airways. The distance from Winnipeg to Calgary is about 800 miles, and it is expected to cover this in less than nine hours, making two round trips a week.

ENGLAND

A NEW altitude record for light planes is believed to have been established in England. On October 4, Lady Heath reached 23,000 feet in her "Cirrus Moth" after taking off from Croydon Aerodrome. The time required was 1 hour 10 minutes. No oxygen apparatus was used, and Lady Heath did not feel any necessity for it. The record is subject to the usual confirmation by the F.A.I.

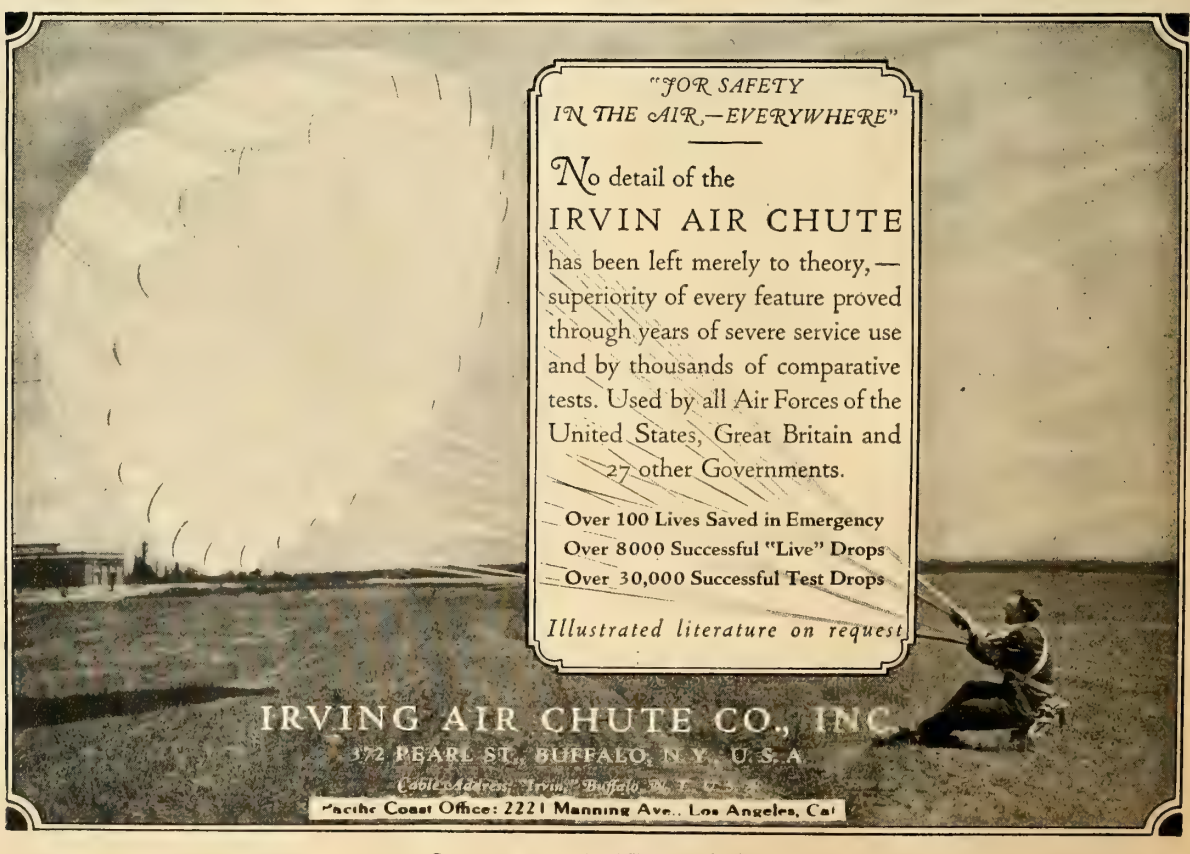
THE Royal Aeronautical Society at a recent meeting awarded the Sir Charles Wakefield Gold Medal, which is awarded annually to the designer of any invention contributing to safety in flying, to F. Handley Page. This award was in recognition of Mr. Page's work in connection with the automatic slotted wing device.

The society presented its Silver Medal, which is awarded for advance in aeronautical design, to B. N. Wallis for his notable work in airship design.

H. Roxbee Cox was the recipient of the R.38 Memorial Prize, which the society offers annually for the best paper on some technical subject in the science of aeronautics. Mr. Cox's paper is entitled "The External Forces of an Airship Structure."

LEUT. COMMANDER H. C. MACDONALD, retired British naval officer, took off from Harbor Grace, N. F., at 11:15 a. m. October 17, in an attempt to span the Atlantic in his Gipsy Moth DeHavilland biplane. Flying alone, he took an east-southeast course. A Dutch steamer reported having sighted the plane at 7:30 o'clock that night, when 700 miles east of Harbor Grace, but no further word has been received regarding the flier.

A. V. ROE, LTD., of Manchester, England, has acquired the manufacturing rights of Fokker commercial aircraft for Great Britain and British Possessions, except Canada. The Fokker company also has closed a manufacturing contract for Canada with Canadian Vickers, Ltd., of Montreal.



THE "SENIOR" BUHL AIRSEDAN



The latest model of the AIRSEDAN equipped with either Wasp, Hornet or Cyclone engine.

An eight place commercial cabin airplane equipped with dual controls and incorporating the same characteristics for which the AIRSEDANS are popular.

Comfortable, heated, soundproof, easy-conversation cabins are characteristic of all Buhl AIRSEDANS.



The Buhl Airsedan

Built for operators and corporations whose executives must fly to fulfill important engagements.

The pilot's compartment is separated with a partition so that conversation can be carried on without interference.

Equipped with Wright Whirlwind engine and licensed to carry a useful load of 1,628 lbs. High speed, 120 M.P.H.



The Buhl Special Airsedan

For those who desire the maximum in performance and the cleanliness, comfort and sociability of the closed cabin.

Built either single or dual control with space for two passengers and an ample baggage compartment.

Equipped with a Wright Whirlwind engine this model has made 139 M.P.H. and is licensed for 1,400 lbs. pay load.

STANDARD EQUIPMENT (all models)

Self starter, brakes, metal propeller, compass, air speed indicator, navigation lights, tachometer, altimeter, clock, fire extinguisher, fuel, oil pressure and oil temperature gauges, air corps throttles, strainer and fuel valve, exhaust manifold and cabin heaters.

DISTRIBUTORS

California:	Buhl Pacific Co.	—	—	Los Angeles, California
In the Northwest:	Mamer Flying Service	—	—	Spokane, Washington
Ohio:	Johnson Flying Service	—	—	Dayton, Ohio
Eastern Canada:	National Air Transport	—	—	Toronto, Canada

BUHL AIRCRAFT COMPANY

Marysville, Mich.

AUSTRALIA

THE flight across the Tasman Sea from Australia to New Zealand was accomplished September 10-11. The *Southern Cross*, famous trans-Pacific plane, was again piloted by Squadron-Leader C. E. Kingsford-Smith and Flight-Commander C. T. P. Ulm, with T. A. McWilliam as radio operator and H. A. Litchfield as navigator. The airplane left Richmond Aerodrome, Sydney, N. S. W., at 7:11 p.m. (New Zealand time) and arrived at Sockburn Aerodrome, Christchurch, N. Z., at 9:20 a.m. The flight thus occupied 14 hours 25 minutes.

The airmen met with several storms during their crossing, and a mishap occurred to their short-wave radio equipment, which made it impossible to communicate with the ship during part of the flight. After sighting New Zealand, the *Southern Cross* made for Wellington and circled over the city for several minutes before heading south for Christchurch, where an enthusiastic welcome awaited the fliers.

The New Zealand government made a grant of £2,000 to the airmen in recognition of their achievement.

The *Southern Cross* successfully accomplished the return flight from New Zealand to Sydney on October 11.

HOLLAND

NEWS FROM HOLLAND

By G. E. Bakker

AIR service in the Dutch East Indies, with a native population of 60 million, has been started by a new Dutch organization, I. L. M. (East Indian Air Service Company), recently registered at the Hague. The new company, capably financed and because of its coöperation with K. L. M. (Royal Dutch Air Lines) technically well equipped, has been granted the right to carry on all operations in connection with tropical commercial aviation. The company has commenced the first two of its projected daily services for mails and passengers, which brings such main centers of Java as Batavia, Bandoeng, Samarang and Sourabaya within a few hours of one another. In January the company will open a weekly service by seaplanes between Batavia, Singapore and Deli (Sumatra), connecting at the latter place with outward and homeward mail steamers.

The Dutch East Indian Government, which grants the new company a subsidy of $2,100,000, extending over a period of six years, supplies all air fields and other ground equipment required.

Expected coöperation with Eastern Airways, Ltd., establishing an air service in the Malay States which provides for daily runs between Penang and Singapore, may result in additional services linking Java and Sumatra to the Malay States. Coöperation is also expected with regard to Western Australian Airways, Ltd., in connection with projected weekly services for mails and passengers between Java and Australia.

Royal Dutch Air Lines (K. L. M.) are arranging to operate next year a monthly air mail service between Holland and the Dutch East Indies, which are separated from each other by an airline distance of 10,000 miles. The first five Fokkers 7A (three Armstrong Siddeley "Lynx" engines), to be used on the Java lines, are consecutively flying out to their operating bases and carrying the Dutch mails. The establishment of this service would reduce the time between the East Indies and Holland by 15 days, 35 days being required at present for dispatch of mail between these two points. The trail flights were made over a route extending 14,568 km., from Amsterdam through Karachi, Rangoon, Bangkok, Medan and Palembang to Batavia.

NEDERLANDSCHE Vliegtuigenfabierk (Dutch Fokker Works) have now been granted permission by the British Government to have Fokker planes manufactured in England. The planes will, under a license agreement, be manufactured at the works of Messrs. A. V. Roe & Co.

The French Compagnie Internationale de Navigation Aerienne has also provided for an extensive use of Fokker planes on its daily services between Paris and Constantinople, but at this writing negotiations concerning the required governmental approval are still being carried on with the recently established French Air Ministry.

THE 27th International Air Service Conference was held at the Hague September 25-29 and was attended by official delegates of Holland, England, France, Germany, Switzerland and Belgium.

LIBERTY MOTORS

For Aeroplanes and Boats

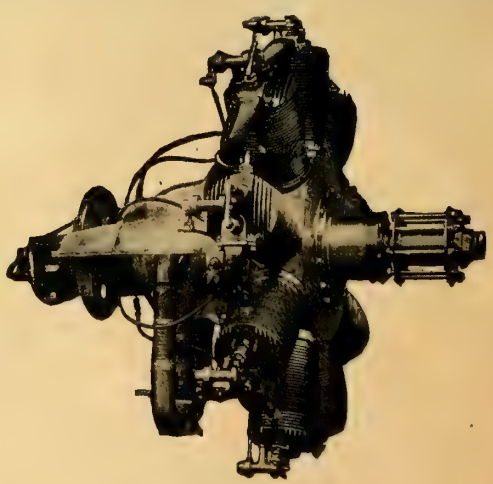
For Export and Domestic Use

LIBERTY PARTS

The Vimalert Company, Ltd.

807 Garfield Ave. Jersey City, N. J., U. S. A.

RADIAL RHONE
CONVERTED AIR COOLED ENGINES



9 cylinders
120 H.P.—1450 R.P.M.—330 Lbs.
DUAL IGNITION TYPE with
SCINTILLA MAGNETOS now ready.
DETAILS ON REQUEST.
TIPS & SMITH, INC.
P. O. BOX 153 HOUSTON, TEX.

Say you saw it in AERO DIGEST

TO HUNDREDS OF AIRMINDED PEOPLE THROUGHOUT THE COUNTRY I AM OFFERING AN OPPORTUNITY TO SECURE PHOTOGRAPHS which I took on a six thousand mile airplane tour over twelve European countries early this summer and which are of interest to everyone.

The price of these photographs is 20 cents each and 6 for $1, postage paid. These are not cuts, but actual photographs. A partial list of these photographs follows:





For the careful airplane purchaser an assortment of slightly used demonstrator planes of the various types is offered at a substantial discount: American Eagle, Travel Air, Command-Aire, Monocoupe, Stinson Detroiter monoplane, Ryan Brougham monoplane, Curtiss JN4, Standard J1.

To the Aviation schools who desire used instruments, compasses, altimeters, air speed indicators, temperature gauges, oil gauges, odd propellers, airplane wings for instruction work, in patching and for rebuilding, I have a large assortment at very low prices.

To the man who wants a cheap airplane engine for experimental work, motor sleds or ice boats, I can supply 15 different types of engines at prices from $50 up.

Zipper flying suit, fur collar and fleece lined, $35.

Winter helmets all sizes, $3 each.

New catalog just off the press will be mailed on request.





Landing Field at Rotterdam, Holland.
Landing Field at Hamburg.
Albatross biplane, 10 passenger.
Marvaux, France, Village where Frank Luke was shot down.
Junkers 3 motored plane.
Junkers single motored passenger plane.
Landing field at Brussels with Farman Jabiru and Handley Page plane.
Landing field at Copenhagen, Denmark.
Two engine Fokker, 16 passenger and Avia biplane at Rotterdam, Holland.
Armstrong Argosy, 21 passenger, at Le Bourget.
Mechanics working on Spad at Le Bourget.
Beliot Transport plane at Le Bourget.
Special monoplane, French type, for Trans-Atlantic flight, Le Bourget.
Restaurant plane at Le Bourget.
Ft Vaux, Verdun.
Belleau Woods, near Paris.
Scenes from Ft. Vaux near Verdun.
Hills around Verdun, France.
Reserve planes at Tempeldorf Field, Berlin.
Farman Goliath at Le Bourget.
Italian Fiat plane the day Costes and Le Brix returned.
Farman Jabiru at Le Bourget.
Planes at field in Copenhagen, Denmark.
Tempeldorf Flying Field at Berlin.
Flying Field at Rotterdam, Holland.
View of Croydon Airport from the air.
Control tower at Croydon where Lindbergh was received.
American locomotive pulling French freight train. Part of A. E. F. equipment.
Assorted ocean pictures taken from George Washington and Berengaria on way over and back.
Ten Assorted pictures taken in the city of Paris, Napoleon's tomb, etc.
Malmo, Sweden, taken from air.
French type training plane at Le Bourget.
Hangars filled with various types of planes at Le Bourget.
Hill and field where Luke was shot and killed, Marvaux, France.
Twenty assorted pictures of lower New York with Statue of Liberty and scenes from Edinburg, Scotland.
Steamer Berengaria, Cunard line, coming into Cherbourg.
Assorted scenes in and around Rome, Italy.
Assorted pictures around Berlin of public villages and palaces. Not aviation pictures.
Assorted pictures in and around Vienna, Austria.
Administration Building, Frankfort, Germany.
Harbor at Rotterdam, Holland, taken from the air.
Berlin Airport taken from air.
Small village enroute from Frankfort to Berlin, taken from air.
Rohrback Flying Boat at Lubbick, Germany.
Buildings and field at Croydon, Airport of London.
War buildings in London.
Assorted pictures showing Warwick Castle, Stratford-on-Avon, Shakespear's home and vicinity.
English passenger train.
Rheims Cathedral.
Second Division monument, Argonne Forest.
American cemetery at Thiacourt.
Major Lufberry's grave.
The Pennsylvania monument, Vareene, France.
Scenes around Issodon, France.
Administration buildings with 3 different air liners at Croydon.
Crown Prince dugout in Argonne.
The Moscow plane being serviced at Berlin.
Modern type hangars at Berlin.
Grave of Baron Manfred Richthofen in Berlin.
Four different types of commercial German airplanes on display at Frankfort.

MARVIN A. NORTHROP
730 Washington Avenue North
Minneapolis, Minn.

Picked from the Air



AERO DIGEST will award a prize of $5 each month for the best humorous contribution published. Only those pertaining to the aircraft field will be considered. Address the "Picked from the Air" Department, Aero Digest, 220 West 42nd St., New York, N. Y.

S. Quentin Lindberg, Duluth, Minnesota, won the prize for November.

Martin Jensen thought that he had his full share of good luck when he flew across the Pacific in the Dole races last year, but now he knows that luck is still with him. In company with Bartlett Stephens, assistant superintendent of San Francisco's municipal airport, Jensen started to make a flight.

The plane speeded down the runway, started upward, careened to one side and nearly crashed, when Jensen seized the dual control, righted the ship and held her aloft.

"Gee whiz, Bart," Marty yelled, "that's the sloppiest take-off you ever made."

"Me?" replied Stephens. Hell's bells, I thought you were at the controls. I wasn't."

My Flight in the Graf Zeppelin

By Elmer Twitchell

(*Mr. Twitchell was a passenger on the epic cruise, unknown to those in charge. He was disguised as the canary.*)

"Well, it was a wonderful trip and I would have enjoyed every moment of it, even if I had got off at the Azores. You have no idea how it seems to be up there in the air in a great big airship a thousand miles off your course and no way of telephoning the folks that you will be a couple of days late getting home.

* * *

"Would I make a transatlantic trip that way again? Every time. You have a few hardships, yes, but you don't have to stand for any ship concerts.

* * *

"And no steward comes around banging on your stateroom door every fifteen minutes demanding that you take a bath! On the Graf Zeppelin nobody asked me once to take a bath. So far as I know nobody took one. There was one moment—that time when the fin tore—that we thought we would all take one together, though.

"When I got aboard the Graf Zep I understood I was going directly to New York. My ticket was punched that way, and this Captain Eckener looked honest. I paid no further attention to the scenery for the next couple of days and I was beginning to pack up and get off at New York when I looked down and realized there was some mistake. Grover Whalen was no place around, and, although we were over an island, we could not hear Max Steur or any steel riveters. I asked the skipper where we were and he said over Bermuda. I knew then I was on a local.

* * *

"The only scare I got came when one of the motormen stood the bag on end so some of the Hearst correspondents could fill their fountain pens without taking the bottle off the shelf. We tore a fin in that maneuver, and I was for sending out an S O S, giving our position, but it seemed we couldn't give our position on account of it not being in the contract. The ship had a contract with Mr. Hearst stipulating that we couldn't give out any clews to our whereabouts, fin or no fin. If the worst came to the worst we could notify Hearst and be rescued exclusively by the King Features!

* * *

"Well, we got through all right, the only injuries being minor bruises and abrasions sustained in the rush of passengers from point to point to write their impressions for the chain newspapers. By this time supplies were low and we were notified we would have to live on champagne and caviar for the rest of the trip. A lot of the passengers then petitioned the skipper to tear off the other fin.

* * *

"Never will I forget the first sight of America. 'America ahead,' said the skipper. 'How can you tell for certain?' I asked. 'I can hear the stock market tickers,' he said. Then we knew he was right.

* * *

"The flight over President Coolidge was very inspiring. It was the first time I had ever seen a President from the air. They look best that way.

* * *

"But the flight over Manhattan was the big kick. I never realized before how much washing could be hung on the roofs of one city.

* * *

"We flew up above Times Square, passing directly over the Shuberts, George Cohan, Louis Mann, Daddy Browning and Paul Whiteman. Whiteman is an interesting sight from the air. He looks like Columbus Circle.

* * *

"Once, above the heart of Manhattan, we had a close call when we nearly crashed into a Chanin skyscraper. It wasn't there when we started up the island, but the Chanin brothers had bought another hotel site and rushed it up without any warning.

* * *

"How high up in the air were we? Well, we were well above the prices for Earl Carroll's Vanities, so you can judge for yourself."



Copyright, N. Y. Tribune, 1928. Courtesy of N. Y. Herald Tribune.

The days of real sport!—By Briggs.

The man who always wanted to do something big might try his hand at pumping up the Graf-Zepp.

Maybe That's It

"I can't explain her coming from Friedrichshafen to New York via Bermuda," says Elmer Twitchell, "unless that one woman passenger is a backseat driver and has got hold of one of those puzzles known as touring maps."

The height of futility: Asking a Graf Zeppelin passenger if he would like to go to the top of the Woolworth tower and see the wonderful view.

H. I. Phillips.
Courtesy of N. Y. Sun.

"THE RONALD AERONAUTIC SERIES, prepared by writers who are authorities on their subjects, is making an important contribution to science. The individual volumes are rapidly becoming classics on their subjects."

B. D. Foulois,
Brig. Gen'l, Air Corps, U. S. A.

"THE RONALD AERONAUTIC SERIES is complete and accurate. I find this information most valuable, not only for the technical man, but for the non-technical man as well. I believe everybody should have these books in their collection."

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Airplane Division, Ford Motor Co.

"WE HAVE FOUND these books most useful for reference. It is the only source of well co-ordinated information bearing on the subjects covered, which is at all satisfactory for our purposes."

Colonel C. C. Carter,
U. S. Military Academy, West Point, N. Y.



C. deF. Chandler
Editor, Ronald Aeronautic Series; Lieutenant Colonel U. S. Army, Retired; former Chief, Balloon and Airship Division, Army Air Service; commanding officer, first Army Aviation School, College Park, Maryland

Foundation Books on Aeronautics

Written by World Leaders of Aviation

SIXTEEN VOLUMES of the Ronald Aeronautic Series are now ready. They provide the only organized, comprehensive source of accurate information in any language on practical aeronautics in all its developments. Space does not permit us to list all, but those described will show you the range of subjects covered. You can examine any or all without advance payment. Select those you want to see and they will be sent, delivery charges prepaid, on five days' approval.

Aircraft Power Plants

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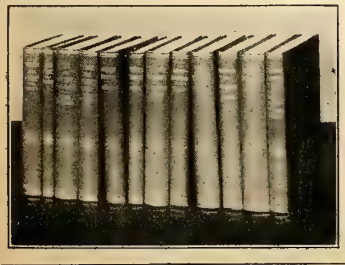
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An Explanation of Flight Principles

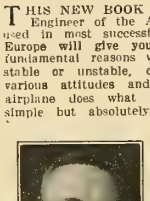
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144 pages, 49 illustrations, $2.50

THIS FAMOUS BOOK supplies in convenient form the kind of information needed by airmen without the more complicated treatment of the subject which is of interest only to professional meteorologists.

Every pilot should know specifically and thoroughly how to forecast weather from local observations. This book furnishes you with the kind of information needed to understand weather maps at a glance and to use local observations for immediate forecast of weather probabilities with their application to prospective flying conditions that are likely to be encountered. Among the subjects included in this book are: weather forecasting from clouds; the average height of clouds of each class; the variation in direction and velocity of winds with change of altitude; the frequence of winds from each direction at various altitudes; the characteristics and dimensions of thunderstorms; general circulation of the atmosphere; visibility; instruments and methods of observation; cyclones and anti-cyclones; weather-map making and reading; atmospheric conditions over the North Atlantic ocean and polar regions; distribution of weather forecasts by radio.

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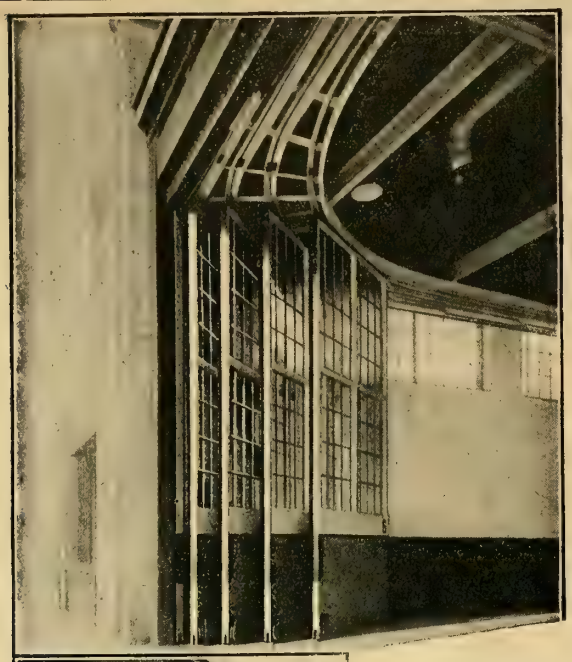
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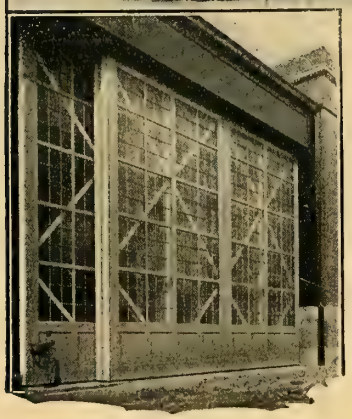
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THE L.Z.127 COMES TO LAKEHURST

(*Continued from page* 895)

The L.Z. 127 follows in a logical procession the designs which have gone before it, and therefore in the *Graf Zeppelin* one finds no radical innovations. It is for the most part merely bigger and greater than the *Los Angeles.* The hull streamlining of the new ship appears to have been carried to the *nth* degree.

The lifting gas is carried in gas cells which fit into seventeen compartments. There is a radical departure in the arrangement of the gas cells in the *Graf Zeppelin.* In twelve of the seventeen gas compartments, the bags carrying the flotation gas do not completely fill the compartments. The compartments are shared with other gas cells in which the Blau gas, the main fuel of the ship, is stored.

The question of fuel gas vs. liquid fuel for airships does not seem to have been definitely settled by the transatlantic flight of the *Graf Zeppelin,* for both gasoline and Blau gas were burned in the course of the 111½ hour trip. The five Maybach V.L. 2 engines powering the ship seemed to take both the gaseous and liquid fuel equally well.

The V.L.2 was adapted to gaseous fuel by hollowing out the throttle valves of the fireproof Maybach carburetors, of which there are four, one to each three cylinders.

From the gas cells containing the Blau gas, pipes lead directly into these valve shafts. An adjustment valve controls the flow of gas according to the throttle's position. Another valve, which has been inserted into the gas feed lines, permits ready change from gaseous to liquid fuel or vice versa in a few seconds, without interruption of the engine's operation or impairing its flow of power.

The adaption of the Maybach motors to both liquid and gaseous fuel shared interest equally with the new self-contained reversing feature of the motor which permits backing the *Graf Zeppelin.* Reversing gears between engine and propeller have been entirely eliminated in the *Graf Zeppelin* by the V.L.2's ability to run in either direction, clockwise or counter-clockwise. Simple shifting of the camshaft, which changes the timing of the thirty-six overhead valves, is the only readjustment necessary to attain reverse motion. A compressed air starter, with a high degree of reliability, cranks the engine in either direction.

(In the September issue of AERO DIGEST, *a detailed description with illustrations of the interior of the Graf Zeppelin were published.)*

COMMERCIAL FLYING IN ENGLAND

(*Continued from page* 897)

speed range of from 95-120 m. p. h. The new gyro rudder and lateral control will be installed shortly on all flying stock, making course flying automatic after the required altitude has been reached.

As far as ground maintenance, inspecting and checking is concerned, the Imperial Airways system is generally conceded to be the finest in the world. The inspectors are licensed and examined annually by the Air Ministry itself. Imperial Airways' pilots are examined semi-annually and are men of long flying experience and exceptional ability. A machine, besides having the benefit of meteorological surveys at the Croydon station, together with reports from along the route to be flown, is, after take-off, in constant wireless telephonic communication with ground stations. A pilot, momentarily lost in fog or above thick clouds, can, by calling Croydon which works in conjunction with a station at Pulham, Norfolk, be positioned exactly after wire-

(*Continued on next page*)



Gordon
AEROTOGS

Commander Richard Byrd and executive staff for his South Pole Expedition, dressed in Gordon Aerotog flying suits, helmets and mittens made especially for them by Gordon & Ferguson, Inc., Saint Paul, Minnesota. The Commander's suit is of natural unplucked Alaska seal skins.





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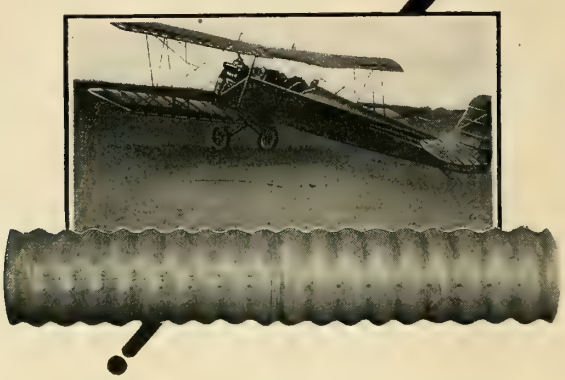
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(*Continued from preceding page*)

less bearings have been taken on him by the two stations. Similarly in exceptionally dirty weather, all cross-Channel machines are given different altitudes by wireless telephone to obviate all chance of collision. A pilot may also call passing machines to check up on weather developments along the route.

With Imperial Airways' meticulous organization of the smallest details, it is not to be wondered at that no passenger has been killed or injured for the last four years—a record any railroad company might well be envious of.

Imperial Airways is not an English concern alone—it is of the Empire and will, in time, be Empire wide. The England-Continental routes at present connect with the Cairo-Basra service through the medium of French and German lines, but in time they will be joined by Imperial Airways 'planes. The first step in hooking up the Empire-wide service will come with the inauguration of the England-India mail run to be made in the new Short "Calcutta" boats of which we have heard so much lately.

One of the three planned has already been commissioned and is being used on the Southampton-Guernsey run at present. I flew over and back in her recently, and a first hand word on her would perhaps not be amiss. Owing to her color, the dihedral and the overshot top plane, she does not look her size, but from tip to tip she is a trifle wider than the *Leviathan*. All metal in construction, she is powered with three Bristol "Jupiter" geared motors, developing a total of 1,450 h.p. Full out she will do 113 m. p. h., but cruises beautifully and lands at 90.

As big as she is, she handles beautifully, and bumps seem to melt against her in despair. The day was especially windy with the usual water bumps over the Needles (as of yore—eleven years of yore), but there wasn't enough movement to this flying yacht to move a large glass of lager from the shelf in front of me. I know that for an absolute fact.

The schedule has not been completely worked out for the regular London-India service, but with these boats on it, there is every reason to believe that it will be as safe, sure and regular as the other Imperial Airways' lines, in spite of the tremendous distance to be covered. That is the backbone of the organization—safety, efficiency, regularity, and slowly but surely, in spite of stiff competition and a dwindling subsidy, Imperial Airways is putting flying on a paying business basis.

Lighter-Than-Air

The R.100 and the R.101 are nearing completion, and the hush-hush attendant upon their construction has been partially lifted. The R.101 will next year go into the England-India passenger service, with a capacity of 100 people exclusive of crew. She is the first dirigible to burn crude oil in her motors, thereby lowering the fire risk attendant upon lighter-than-air craft. Overall, she measures 724 feet, with a height of 140 feet, and a lift of 150 tons. Passenger accommodations include upper and lower promenade decks, a large lounge, dining saloon, seating fifty people at one time, and capacious cabins. She is Government built at the Royal Airship Works, Cardington, Bedfordshire.

The R.100 is Commander Burney's ship, built by the Airship Guarantee Company, and at the present writing is the more nearly completed. Details of her construction are lacking, but unless plans have been changed, she is destined to make her maiden passenger trip across the Atlantic, at an individual one-way fare, I have heard it whispered, of 5,000 dollars with takers already.

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Position Finding By Star Altitude Curves

(*Continued from page* 918)

for a line of position in the usual way.

The equipment used weighed about eight pounds, including the sextant box. The sextant and the watch are the expensive items of equipment, but these are necessary for celestial navigation. It may interest the reader to know that the same sextant, watch and curves were used in the instruction of Col. Lindbergh by the writer during May, 1928. He was able to take observations with one hand and pilot his plane at the same time, which so far as is known, was never done before.

In a test of the sextant for accuracy, the writer reduced the error to an average of 1.4 miles for six observations. In this case the "Line of Position Book" was used, the sextant error carefully removed, and the watch carefully checked.

In using the curves on a steady platform, the errors should not exceed four or five miles; in a plane under average conditions, errors should range from ten to fifteen miles.

AIR—HOT AND OTHERWISE

(*Continued from page* 893)

capital, in practically unlimited sums, from one of the most conservative groups in the United States. Thus money from the right source goes into the right hands to be used for the right purposes.

The fact that these two magnificent business enterprises of the new industry and art are floated without a cent of underwriting costs, or promoters' profits, makes them a pleasant contrast to various other aviation enterprises which have done nothing very much worth while in the air ocean which is aviation's, and in that upper financial sea wherein high finance presumably sails mighty ships, sometimes for profit, sometimes for profiteering, and which usually have left nothing but a smudge. Those smudges sometimes have been most puzzling clouds for decent American aviation to fly through.

Mr. Boeing proves that he is competent as a financial steersman, as well as skilled as an air pilot, by associating himself with K. R. Kingsbury, president of the Standard Oil of California; Fred Rentschler, president of the Pratt and Whitney Aircraft Corporation, manufacturer of the famous Wasp and Hornet engines; and Chance Vought, who has demonstrated his ability both at manufacturing and at selling planes. This man puts a good deal of power into the new enterprise. Working with the others, it is a certainty that the group never will be compelled to a forced landing because of lack of fuel, lack of knowledge, lack of engine energy or lack of enterprise.

So there you are, Brethren of the Air. These two groups are certain to make very fascinating history for American aviation. From now on we shall hear from them continually in big ways, in right ways, in air ways.

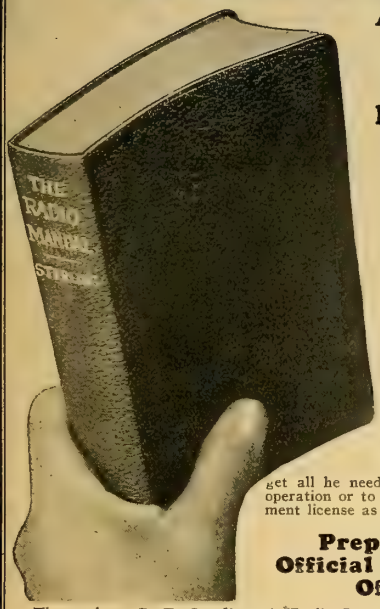
VARIOUS newspapers, to our deep regret, including the usually intelligent *New York Sun* and *New York Times*, fail to understand the American Legion's undeniably able reasoning. The *Sun's* editorial writer, who attacks the resolution of the Legion's San Antonio Convention, evidently got his air-education from the Secretary of the Navy, who always has refused to achieve information on any detail of real aeronautics. Naturally, The

(*Continued on next page*)

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to every question about the principles, methods, or apparatus of radio transmitting and receiving.

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Prepared by Official Examining Officer

The author, **G. E. Sterling,** is Radio Inspector and Examining Officer, Radio Division, U. S. Dept. of Commerce. The book has been edited in detail by **Robert S. Kruse** for five years Technical Editor of QST., the Magazine of the Radio Relay League. Many other experts assisted them.

16 Chapters Cover: Elementary Electricity and Magnetism; Motors and Generators; Storage Batteries and Charging Circuits; The Vacuum Tube; Circuits Employed in Vacuum Tube Transmitters; Modulating Systems; Wavemeters; Piezo-Electric Oscillators; Wave Traps; Marine Vacuum Tube Transmitters; Radio Broadcasting Equipment; Arc Transmitters; Spark Transmitters; Commercial Radio Receivers; Radio Beacons and Direction Finders; Radio Laws and Regulations; Handling and Abstracting Traffic.

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(Aero Digest 11-28)

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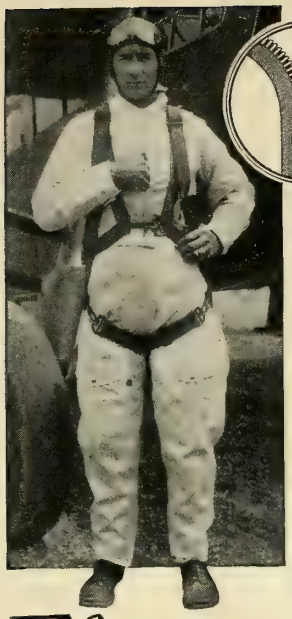
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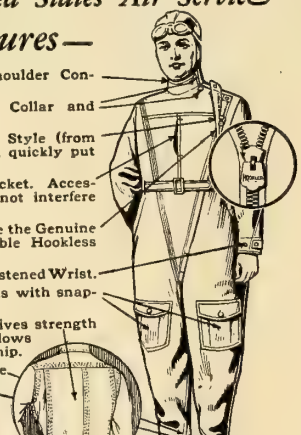
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(*Continued from preceding page*)

change from battleships, cruisers and other clumsy implements of war, to the whizzing cohorts of the air is too great for the naval heads to comprehend and, inasmuch as it entails the virtual elimination of the nonprogressive aged, approval would be a process far too sacrificial to be reasonably expected of hearts hardened for so many years by the close juxtaposition of brass buttons. As the brass from buttons ingrows into the heart, brains ossify, becoming ivory. And the popularity of motoring has almost utterly destroyed the billiard table business. We need far fewer ivory balls for that game and pool than once we did. It leaves the once magnificent material of the upper Naval intellects practically without utility unless one wishes to set up in business as the carver of small ivory ornaments —little false gods, for instance.

But why should such intelligences as those of *The Times* and *Sun* pursue so faint a will-o'-the-wisp as the dull glint from solid ivory domes of alleged thought?

The Sun says: "It is not quite clear why the delegates to the American Legion convention should have adopted without a dissenting voice the resolution calling for a Federal Aeronautics Bureau to have jurisdiction over Army, Navy and civil air services."

Then it calls General Mitchell saucy names and presently continues: "The resolution commits the Legion to lobbying for the creation of the Aeronautics Bureau. . . . (The dots indicate omission of lo, many foolish words.) . . . . The best military opinion recognizes the airplane as an invaluable auxiliary arm, but it is no more ready to adopt such a proposal (making Air a separate branch) than it would be to support a suggestion for the creation of a separate gun bureau to have jurisdiction over all machine guns used by the Army, Navy and Marine Corps."

The writer of this editorial probably is a graduate of the Naval High Command, drifted by accident or for propaganda purposes into the usually more carefully defended places of the nation's journalism.

The Times, wiser in its reasoning, but far less heroic than the misguided *Sun,* does not come out in personal condemnation, but merely quotes that which has been voiced by Army and Navy men who, if General Mitchell's sensible suggestions should be put into execution, would be deprived of that authority which they love to hold over the Air branches of the national defense, but which their ignorance renders it a dangerous thing that they should hold.

America is, in truth, the Eagle's Nest, the land of fighting fliers' splendid origin. Profoundly we admire our Army and our Navy. They have made great records on their horses and their weary, plodding feet, as in their fighting ships. But this new breed of fighters is a NEW breed. The safety of the nation depends upon its right development. It is the dictate of plain commonsense (as the American Legion indicates it fully knows) to keep it as wholly in the control of experts as human ingenuity can render possible. Let soldiers head the Army, let sailors head of the Navy, and, for the love of Mike and other supreme gods of common or garden reasonableness, let fliers head a single, undivided and coherent flying fighting force!

These editorial writers assume uncanny knowledge which we doubt if they possess. They assume a greater wisdom, for example, than that possessed by the General Staff of France and England. They assume a greater familiarity with essential facts than that achieved by the Hon. W. Frank James, who, ever since the Spanish War, has been a careful student of the problem of our national defense and during his entire time in Congress has given, possibly,

(*Continued on next page*)

SOME time ago we stated that Aerol Shock Absorbing Struts were becoming a factor in the selling of airplanes.

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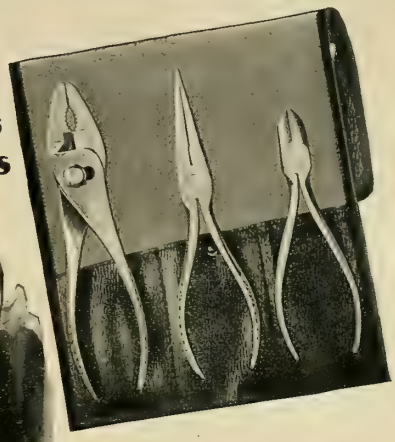


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(*Continued from preceding page*)

more attention to the relationship between it and the airplane than all the other members of our legislative branches put together.

Not longer ago than last month he came out once more for the general idea of a National Defense Department. The lines which he suggested are not precisely those suggested by General Mitchell and the Legion, but that is to the good. Let's get as many real, man's size, honest-to-god suggestions from real minds capable of thought as possible, and then out of the lot and combining the best details of them all, fashion something which will really be right.

I do not argue as I do because the men in the Air Services deserve all that the nation can give them. They are not askers. I argue as I do because the country, fat, inconceivably prosperous and tempting, needs all that the men in the Air Services AND NOBODY ELSE can give it. That is the mighty fact which lies, now, at the bottom of the situation.

MALICE IN BLUNDERLAND

(*Continued from page* 902)

a companion-way. "The air pilots' quarters are at the stern, right over the propellers. What they lack in space, air, and light, they make up in vibration. You may throw away that turbine blade now."

"But doesn't it belong to the engine?" asked Alice.

"Yes, but that doesn't matter," replied the Crab casually. "I don't suppose it would fit. And if it did fit, it would crack anyhow. Just throw it away—the builder makes a profit on each blade. And who are we to do him out of his profits?"

Alice threw her blade out of a porthole, and examined her surroundings. She was in a tiny, white-painted cell, with a washstand, a closet, and a bunk marked "Standard Naval Bunk." Several uniforms hung on the wall, and some pictures from *La Vie Parisienne* added a touch of revealed feminine charm to a room essentially masculine.

"Here's a midshipman's uniform," said the Crab, "in which you might disguise yourself. They're a very tender and callow lot, midshipmen; you'll have no difficulty in looking like one. It's amazing, when you come to think of it, that anything as tender and blushing as a midshipman or an ensign could grow up into a hard-boiled old Admiral. It's very pathetic, too, and moves me to tears."

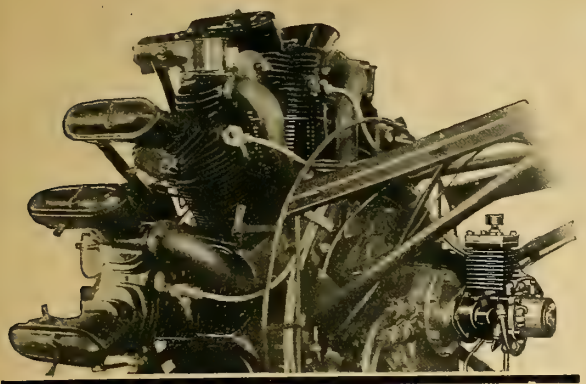
Again the Crab had recourse to his clam-shell, into which he cried broken-heartedly, just outside the door, while Alice slipped off her dress and slipped into the uniform, which, outside of being a little snug in the hips, fitted her to perfection.

"Ah," exclaimed the Crab, entering the room and surveying the transformed Alice. "You surely look the part. But don't smile so sweetly when you meet the Admiral—or you'll find yourself promoted to Lieutenant. But let's go topside and watch them taking the ship out to sea. It stuck, coming in; I wonder how they'll get it out."

When they reached the deck they found that the *Lexington* already had backed out into the Hudson, which it blocked completely from bank to bank; the stern of the ship was wedged against the Jersey shore, while the bow appeared to be imbedded in the New York bank. "It always does this, confound it!" exclaimed the Crab. "Now we'll have to blast out the shores."

A dynamiting crew, from Chicago, was busily engaged laying charges in both banks—this particular crew had been blowing up banks for years and years. In a moment two loud detonations rent the smoky New York air. For a few seconds the sky was visible; then the smoke closed in again as usual. The *Lexington* shivered like an admiral who had been caught writing for the *Saturday Evening Post,* and turned partly around, while sixteen tugs placed their snub noses against its sides, and shoved. Nothing happened, except that the Captain said, "Damn!" Sixteen more tugs came snorting and puffing up, at a charge to the tax-payers of six dollars a snort and eight dollars a puff. When the thirty-two tugs had snorted and puffed $1,987 worth, the *Lexington* turned slowly and

(*Continued on next page*)



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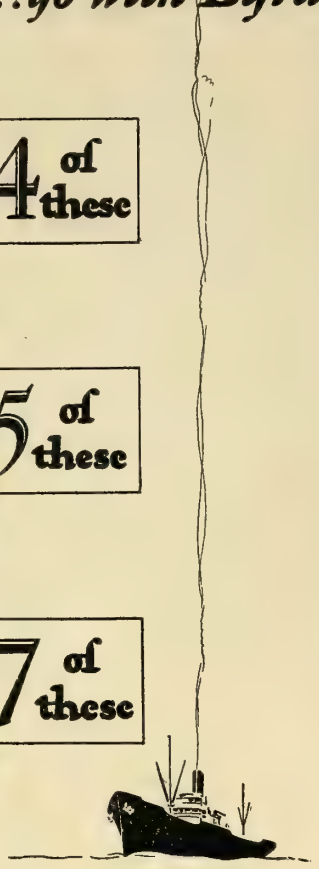
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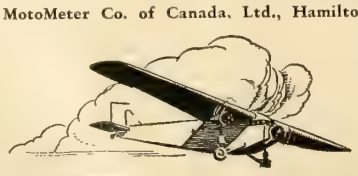
These instruments (see illustration 1) are designed to read in the cockpit the atmospheric temperatures out on the edge of the wing.

The air-cooled engines of his Ford tri-motor, his Fokker and his Fairchild 'planes are equipped with a standard Model C MotoMeter each, for reading the lubricating oil temperatures. (See illustration 2)

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(*Continued from preceding page*)

with dignity, pushed two ferry-boats and a barge ashore, knocked over a dock, and started down the river, emitting several melodious blasts from its whistle. Each blast used up $57 worth of steam and wore 18 cents' worth of brass polish off the whistle.

"How do you enjoy it?" asked the Crab. "Isn't this the most expensive ride you ever had?"

"Is it very expensive?" asked Alice innocently.

"Expensive!" exclaimed the Crab. "Why, it costs the tax-payers eight dollars and seventeen cents to move this contraption one inch. Look there!"

He pointed to an army of men who were moving the Woolworth Building farther from the shore. "We struck it coming in," said the Crab, "so now they're not taking any chances with it. You know, this boat doesn't handle any too well—it's so big. There!—We've just run over the *Leviathan!* I wish they'd keep those little boats out of our way. The only safe thing to do with them is to pull them all up on shore until we get past."

"Wouldn't this thing be a very large target for an enemy to hit?" asked Alice.

"Of course it would," said the Crab. "But the Navy never thought of that when they built it—thinking is *so* tiring to Naval minds, you know. But the very look of the thing is supposed to terrify an enemy bomber so much that his aim will be bad. The Naval theory is that an enemy gunner or bomber, looking at this huge contraption, will be so shocked that his hand will joggle. A reasonable theory, isn't it?"

"As reasonable as anything else in the Navy, I suppose," agreed Alice. "You know, it seems to me that a smaller and faster ship would have made a better carrier than a condemned battleship hull. We could have had four small carriers for the same cost and tonnage that would have handled four times as many airplanes in the same space of time. Wouldn't that have been better for the Navy?"

"Better for the Navy, but not for the contractor," said the Crab. "The Navy is run mainly to benefit certain individuals, you know. And how they do benefit! You'd be surprised. In order to move this thing faster than a walk we had to install enough electrical machinery to light the City of Philadelphia—not that there's much use in lighting that place. But there you are."

"Where am I?" asked Alice.

"That's what the Navy is asking," replied the Crab. "Where are we? And they don't know where they are—they don't know what to do with these huge hulks, now they have them. They're considering changing the names of these floating Lakehurst Hangars to the Barnum and Bailey, in memory of the man who said there was one born every minute—only he'd have to revise his figures if he walked into the Navy Building."

The *Lexington*, meanwhile, was proceeding down the bay and pointing its nose toward the open sea, which took on a shuddering movement as the peculiar vessel approached.

"Swab my scuppers!" exclaimed the Crab suddenly. "Look at that now!" He pointed toward the Jersey shore, along which the ship was steaming—at a cost of $7,654.32 per mile, including repairs, upkeep, depreciation, and interest charges, and not counting valet service for senior officers, which ran the cost a lot higher than that. "Just look at the *Los Angeles!*"

Alice looked toward the shore, where a large affair somewhat resembling a huge bologna sausage was standing on end and waving back and forth in the breeze.

"Surely that isn't the *Los Angeles,*" said Alice, who had seen dozens of pictures of the big blimp. "It doesn't fly in that position, with its tail in the air."

"It isn't flying," replied the Crab sadly, reaching for his clam-shell and dropping a few tears into it. "It's at its mooring mast. It always does that, you know. I was there the other day when it got tail-light and did a backward loop. Funny thing was, the Navy got some pictures of the ship standing on its nose, and they wouldn't release one to the Press. I can't understand that—they're so fond of publicity."

As the Crab moved away, little Alice seated herself against the smokestack, which was pleasantly warm. She must have dozed off and slept for a long time, for when she again opened her eyes, the ship was at rest in a clear blue rolling sea beside an island covered with palm trees. The shores of the island were

(*Continued on next page*)



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(*Continued from preceding page*)

very rocky, and a high sea was breaking along the beach, on which a huge ship was stranded. As Alice watched, a sea broke right over the wreck of the ship, which looked very old and rusty, as though it had been there for a very long time.

"We're at Santo Domingo," said the Crab, pausing beside Alice and pointing at the wrecked vessel. "That is all that remains of the United States Cruiser *Memphis,* wrecked by a tidal wave on August 29, 1916. It is a sister ship to the *Seattle,* Admiral Hughes' late flagship. It cost $10,000,000 and after it was hurled ashore was sold to the Dominicans as junk for $10,000. A net loss of $9,990,000 in one hour. We lose things fast in the Navy, you know."

"I should say you do," Alice exclaimed. "But how did you lose the *Memphis*?"

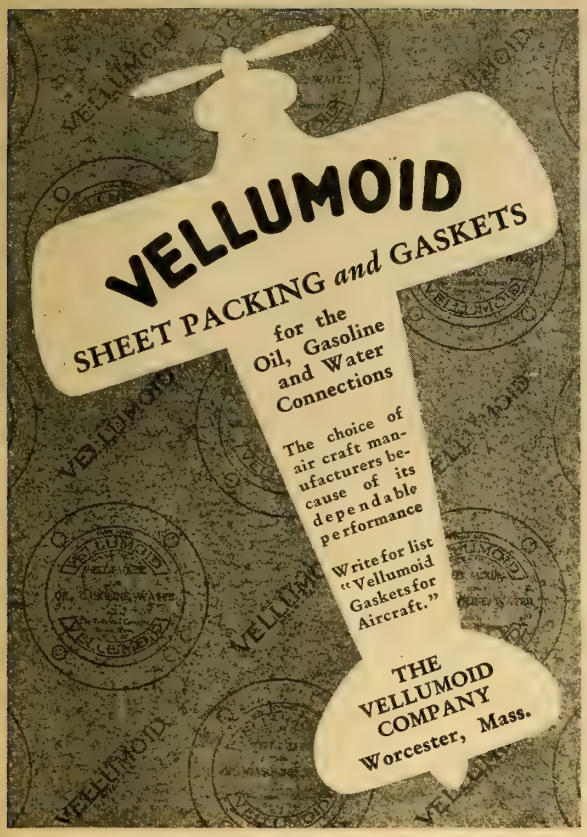
"We were all ashore at a tea party," the Crab began, when he noticed Alice's look of incredulity. "Oh yes," he repeated, "We were at a tea party, or we wouldn't have lost the ship. This is the true story of the loss of the *Memphis,* which you may confirm from the Navy records—and the loss of a ten million-dollar cruiser was due to a tea party given by the Dominicans to the Admiral. As I say, most of us were ashore, with only a skeleton crew left aboard. And to save coal we had steam up in only one boiler—although the ship was lying in an open roadstead, as you can see, without a single bit of protection from the South. And although it is a rule of the Navy that a ship lying to in open waters must have steam on, the only steam in the *Memphis* was that coming from the tea-kettle. Well, those of us ashore got word from the weather bureau of a falling barometer, and were ordered to report back to the ship. Some of us left without even finishing our tea. On the way out to the ship, which was lying a half mile from shore, a tidal wave came bowling in from the south—probably caused by an undersea earthquake—and struck not only the *Memphis,* but the collection of tenders making out toward her. Some of the small boats were overturned, hurling the crews into the sea, which at this place is infested with sharks. The other boats, one of which was mine, finally made the *Memphis,* which already was dragging her anchors.

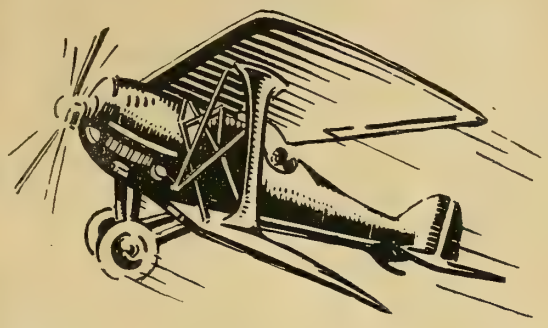
"Well, to make a long story more expensive, we dropped all our anchors, four of them, and hoped they would hold, while we fired up our one boiler to get as much steam as we could to the engines in order to get our propellers turning. We sort of crowded that one boiler and blew out a steam-line. So then we had no steam at all. And that, mind you, despite the Navy rule that any ship lying in open waters shall have steam up! Our steam was up the spout, which was exactly where our ship was going. For a succession of tremendous waves hit the helpless *Memphis,* driving her slowly but very surely toward the rocky coast of Santo Domingo. If we had had steam, we could have put to sea, despite the waves, and could have saved our ship. The proof of which is that a little gunboat, the *Castine,* a former yacht of small power converted to war use, was driven nearly ashore, but was able to steam out to sea. We, however, had been saving coal on the *Memphis* so we'd have enough to boil tea on, ashore. The emergency, therefore, found us long on tea but short on steam, as the brokers say. Most distressing, I assure you. At 4 p. m. we left our moorings, and by 5 p. m. (poor management) we were on the rocks, where the good ship still reposes. Loss, nearly $10,000,000 not to mention about 140 men drowned in the small boats. However," the Crab smiled gently, "the tax-payers don't mind buying us any number of those things. They hate to buy us airplanes, but they'll buy us any number of boats to use on the foamy deep. Do you mind if I cheer myself by singing the 'Foam Song' from Lux?"

Without waiting for permission, the Crab burst into song, keeping time with himself by tapping his claws on the deck, but the tune was so poor and the words so foolish that it is hardly worth while reporting in this story, which is written for a whole flock of busy Admirals to help them keep awake during business hours in the Navy Building at Washington.

"But couldn't you salvage the ship?" asked Alice, more with the intention of shutting off the music than with any thirst for knowledge.

(*Continued on next page*)





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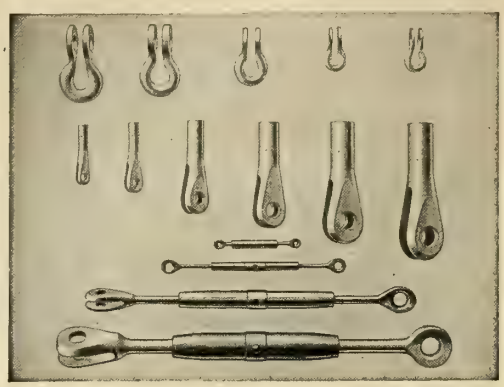
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(*Continued from preceding page*)

"We preferred to leave it on the rocks," said the Crab. "It is a lasting monument to Naval efficiency. American visitors to Santo Domingo get a lot of pleasure out of it. And of course you know our Navy is always charitable when spending the tax-payers' money. Besides, the colored fishermen of the town use this former United States cruiser as a fishing pier. And that's about the most practical use that a cruiser or battleship has been put to in the last few years.

"I see they're getting some airplanes up," said Alice. "Are you going for a flight?"

"Not today," said the Crab with a shudder. "I see they've brought up the famous M.O.1—and I always go sick when they appear. One must be cautious, you know. Pardon me while I hunt up the Doctor and get excused from duty today. I may fly tomorrow, if they give me a Vought. But the M.O.—" the Crab again reached for his clam-shell and cried quietly into it. "The M.O. always moves me to tears," he murmered brokenly.

As he moved away, Alice turned her attention to the M.O.1, which was at the end of the long runway with its motor running. As Alice watched, it lumbered along the deck, into the wind, and finally rose a few feet into the air, where it remained stationary, its engine running like mad, while the plane never progressed an inch. You see, the *Lexington* was steaming into a stiff breeze at the time—a breeze about equal to the famous plane's top speed—so that the peculiar air vehicle, flying full out, yet failed to gain an inch on the carrier. In fact, as Alice watched, the carrier forged ahead, while the M.O.1 dropped behind, its tail quivering paralytically.

"Half speed ahead!" roared the Watch Officer, upon which the ship's engines were slowed down. Still this was not enough. "Quarter speed ahead!" roared the Officer. Quarter speed it was, and still the *Lexington* drew away from the M.O. whose propeller was madly threshing the air. "Full speed astern!" yelled the Officer frantically, upon which the *Lexington* backed up, allowing the M.O. to catch up with it and alight on deck.

"What a slow airplane!" Alice exclaimed to a seaman, who had been quietly fishing over the side all this while.

"It's fast today," replied the seaman. "Most days it doesn't catch up, even when we reverse our engines. About the only thing to do is to put a string on it and fly it as a kite."

Once it had retrieved the M.O.1, the *Lexington* forged ahead at a tremendous speed, burning up $57 worth of oil per minute and wearing itself out at a rate of $543.23 per second. In practically no time Panama appeared on the horizon. In a few minutes the great carrier arrived at the Canal, steamed up it, and stuck fast between the banks! The engines were reversed, along with a couple of decisions by the Captain; the propellers churned up mud. The *Lexington* stayed where it was.

"Full speed ahead!" roared the Officer of the Watch, a Mr. Ingersoll. Full speed it was, without an inch gained. "Full speed astern!" roared the worried Officer; and then: "Full speed sideways!" The *Lexington* merely shook, as though with suppressed laughter. But it didn't budge.

The seaman who had been fishing over the side hauled up his line and seemed mildly surprised to find a land turtle clinging to his hook. "I might as well keep on fishing for turtles," he remarked to Alice. "I guess we're in for the night and a big bill for towing charges."

"Is this usual?" asked Alice. "I mean—this business of sticking in places. We stuck at New York and now we're stuck again."

"Quite usual," said the seaman, baiting his hook with cheese, of which turtles are passionately fond. "First the ship gets stuck, and then the tax-payers get stuck for towage fees. Remember the *Colorado!* When we ran that one on Diamond Shoal, New York, we had every boat in port towing us, except the Fisher Brothers' yacht and Dick Hoyt's speed boat. Now we'll get the Canal mules on the lines and scrape through in a few days. It took the *Saratoga* three days, you know."

At this moment there was a loud ringing of bells, blowing of whistles, and firing of guns. The noise was deafening. Alice might have thought that a war was starting, only she happened

(*Continued on next page*)

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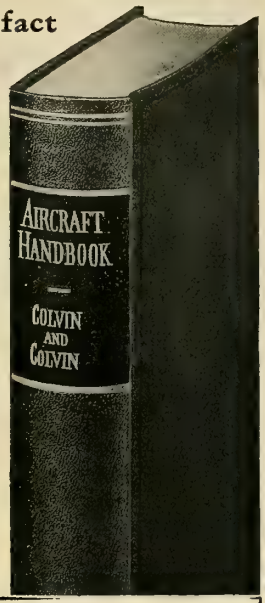
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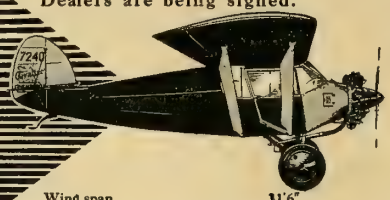
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(*Continued from preceding page*)

to recall that the American Navy hadn't fought in any war since the Spanish one, and that it wasn't apt to do anything to earn its money at this late date, unless it suddenly decided to retire the old men and promote some of the younger and brighter ones.

The noise grew louder and louder. Automobile horns were sounding, policemen's whistles were blowing, an ambulance gong was clanging—and there she was back in Central Park, sitting beside her sister, who, good kind soul, was still holding forth on the cultural benefits that would accrue to the heathen if only the Foreign Mission Board would send them someone like Curtis D. Wilbur to uplift them as he had uplifted the Navy.

"And what a lovely rest that would be for the Navy," said Alice, "especially if they sent him out to the Cannibal Islands!"

THE MORNING AFTER

(*Continued from page* 910)

the American people to do that.

Political excitement is largely a synthetic excitement anyway. It does very well to pass the time between baseball and football seasons, but it took a back seat in the present campaign whenever anything really exciting or important turned up. I was one of those who bethought him that it would be a nice idea to run down to Lakehurst last week and wave a greeting to the inmates of the transatlantic Zeppelin just arriving from overseas. A nice soft Graf that trip turned out to be, too. Well, I got about half way down into the pine belt when I became aware that practically the whole eastern population of the United States had arrived at the same idea at the same moment as myself. Lakehurst, you know, is hidden down in the bad lands of Jersey, where nobody could possibly find it unless he came in an enemy airplane with a ton of bombs to drop on it. There are about two roads into it and one out, and on these roads were gathered the four-wheeled population of three sovereign states. It looked as if someone was trying to prove some of these statistics about the automobiles of the United States placed end to end and reaching from here to there. They stretched from Independence Hall, Philadelphia, clear back to the Discovery of America. It took me five hours to get to a point where I decided I couldn't get any farther. It took me two hours to turn round and six to get back again.

No political candidate has yet stirred up the electorate to the extent that this gas-bag from Germany has done. You could put the Cabinet, the Army and Navy Departments, and the Director-General of the Prohibition Campaign into Tex Rickard's biggest circus-ring, and they would be lucky to draw a million-dollar gate. But to see a silver sausage in the sky and watch it come to earth and unload two or three score thirsty passengers and crew, the American electorate burned up a million dollars' worth of gasoline alone and practically exterminated the hot-dog in South Jersey.

You would suppose that this might serve as a hint to the interested parties that some remarks on aviation should be inserted into the political programs. If there were any such, I missed them. Somebody did mention aviation, I believe, but without saying anything. In general both parties approved of it. There was no evident disposition to say that an airplane should not go up and fly if it had a mind to. Somebody even said that he was in favor of the "advancement of aviation." This, if you ask me, is not a whole lot to say. Aviation is one of those things that has simply got to advance, since there is nothing else it can possibly do. Put a whole lot of designers at work at their drawing boards, another cohort of pilots at their controls,

(*Continued on next page*)

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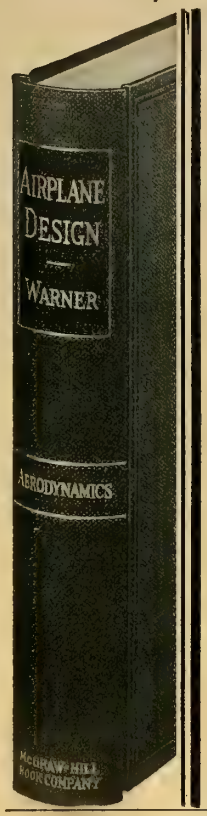
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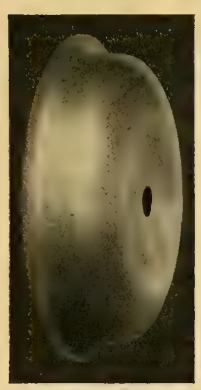
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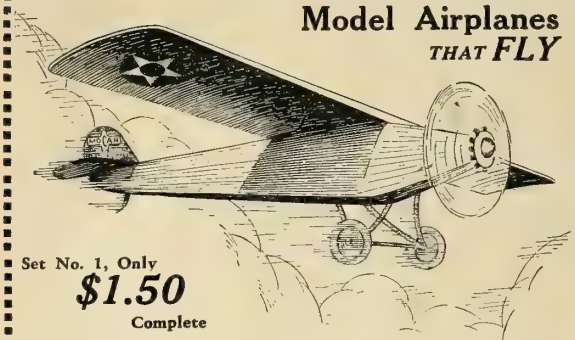
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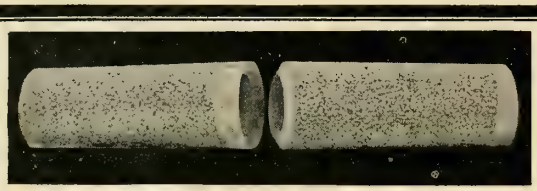


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(Continued from preceding page)

and a lot of impatient youngsters at their heels and after their jobs, and aviation will advance. You bet it will, and does.

The national conscience need not worry much about the advancement of aviation, whether in design, discovery, or plain and fancy flying. But it is certainly and inevitably a matter of public concern, and should be a matter of political program, to see that this young giant among the utilities of civilization gets a fair chance to show its powers. Aviation needs a job to match its capacities. It has already become one of our national resources—a resource of skill, genius and practical experience. Left to itself it will work its way to a bigger and better share in our national life. But with proper and intelligent aid and encouragement from the two sources of political power and public opinion, it will get there a whole lot quicker.

The most obvious need in any political program which admits that aviation is worth considering is some definite word as to national defense. To the layman's eye, at least, there is small evidence that anybody really knows what will be done and can be done to turn the aerial fighting force from a nice idea to a sharp-edged fact. Some of the voters would like to know, and it is a safe bet that, if either party had showed courage and sense enough to be specific on this point, it would have put hundreds of thousands of votes away in its bag. Second to this comes the matter of aerial transportation. There has been a good deal of nonsense and some sense spoken concerning waterways. But waterways are necessarily a comparatively local affair, which is one reason why they have been handled delicately in this campaign, while aerial transportation and communication are a purely national problem. The airplane is just as much at home in the Middle West as on the Canadian border or the Eastern seaboard, and a political candidate might speak his mind concerning business in the air without being suspected of buying votes in this section or that. Past campaigns have seen railroads, the merchant marine, national highways, and rivers, canals and harbors all considered as vital national issues. Why in the name of common sense is the air ignored in this one?

On the other hand we may offer thanks that aviation has not been made a mere political football. American sense cannot tolerate the idea of an aviation party and a non-aviation party. If the freedom of the air is not everybody's business, then we are all barking up the wrong tree. But it is so clearly and inevitably everybody's business that we should suppose that even a politician would know it.

Every vital business in this country is a fifty-fifty proposition between private enterprise and the national government. Modern governments represent nothing but the united sense and caution of the people assuming responsibility for all that affects the people in their life, liberty and pursuit of happiness. A small boy cannot start a peanut stand on a street corner without taking the government into partnership. Because the government is part sponsor of his enterprise, he can get peanuts to sell, can get good money for them, and can carry on business without somebody kicking over his stand and taking all his peanuts. He may think he plays a lone hand, but the government knows better. Aviation is a somewhat more important matter than peanuts, and sufficiently so that none of us would have been distressed by bogeys of government interference if the political parties had declared for a constructive and progressive development of our business. But somehow they didn't seem to think of it.

So when you get down to it, the passing campaign was

(Continued on next page)

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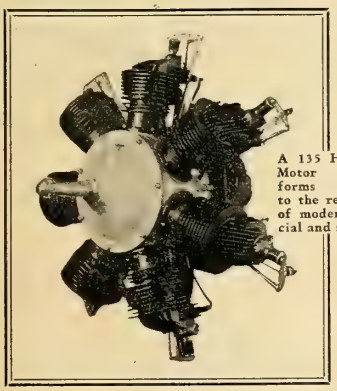
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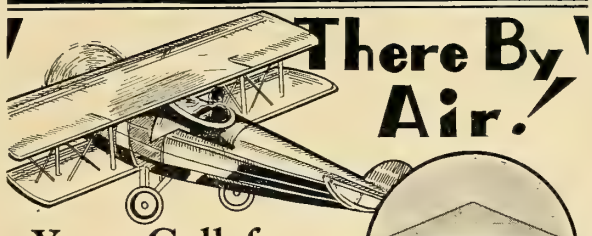
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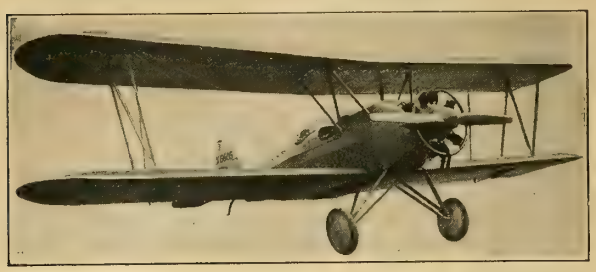
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(*Continued from preceding page*)

not a whole lot different from its ancestors, even though it was trimmed with some new excitements. It failed, on the whole, to get down to brass tacks, in spite of the fact that practically the whole of government is concerned with brass tacks. We shall have to take it for granted that any candidate smart enough to get elected is also smart enough to handle the job when he gets it. And part of the national job at the moment is aviation and all its works. Any party that flops on it is going to be called to account at an early date.

It has been a hot campaign. It took about three months of ballyhoo to get us all ready for the five-minute job of walking into a voting booth and placing a cross to mark the spot where the accident occurred. There have been novelties in the performance. More women voted than have ever voted before, and without making any appreciable difference in the results except that in some districts they used the booths as make-up parlors and seriously delayed the masculine vote. There has been much talk about religious toleration, principally on the part of people who haven't been inside a church since their wedding day and won't go in again until they are carried in. There has been a lot of disturbance over Prohibition, which seems to be a new idea which may work all right when tried, for all I know. There has been some bad language over Prosperity, as though anybody is really opposed to it or has a corner on it. There has been a lot of money spent, none of which came my way; enough to equip a fairly effective little aerial fleet in case of any unpleasantness in the near future. But most of the uproar has been emotional stuff, with no more brains attached to it than usual.

Well, the fun's over and nothing to do but pay the bills and collect the pieces. And by and large aviation is about where it was before election—condemned to work for its living as usual. It always has done so and thriven upon it. Maybe it won't hurt to keep it up.

THE ANTARCTIC AIR EXPEDITIONS

(*Continued from page* 899)

darkness again to the South Polar regions.

His plans are those of a daring man, but in all his work, while Wilkins has shown the greatest daring in his conceptions, he has followed the plan with achievement that has justified the project.

The Byrd Antarctic Expedition, because of its magnitude and the fame of the man at the head of it, is well known wherever the printed word is carried. In size it exceeds that of any other explorer in history on a privately backed undertaking. Two ships are ploughing their way across the Pacific completely filled with men and materials and two more have been commissioned to carry the overflow. Eighty men accompany the Commander, and food and housing for the expedition is being carried to last three years, although Byrd hopes to conclude his work in two.

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(*Continued on next page*)

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(*Continued from preceding page*)

that Byrd hopes to accomplish will be left undone. Although he expects to do some exploring on foot and with dogs—there are seventy-five of these picked by experts to pat along over the ice and snows of Antarctica—the trip over the Pole itself, the survey of thousands of square miles of territory never before seen by man will depend on the planes.

The four ships were selected by Commander Byrd after they had been thoroughly tested by his chief pilot, Bernt Balchen, and Harold I. June, whom the commander borrowed from the Navy to replace the late Floyd Bennett. First in order of size comes the trimotored Ford monoplane. This all-metal ship the Commander felt offered advantages over other big planes because of its duralumin construction, which he believes will be impervious to the rigors of South Polar weather. The plane is especially powered for the high ceilings it must attain over the ice-capped mountains and plateaus between the Bay of Whales and the Pole. The mountains shoot up 11,000 and 12,000 feet, and the plane that succeeds in going over them must carry load enough to get back. The Ford is powered with three Wright motors. The starboard and port engines are Whirlwinds, and the motor in the nose is a five hundred horsepower Cyclone. In tests at Miller and Roosevelt fields, this plane took off easily with a six-ton load and climbed to twelve thousand feet without putting the limit strain on the engines. Tons of spare motors and motor parts are being carried for the Ford alone. Besides the Ford for long hops, the Commander selected two single-motored cabin planes, a Fairchild and a Fokker Universal. They are powered with Pratt and Whitney Wasps, motors that turn up better than 400 horsepower and which in the Fairchild and Fokker provide a cruising speed of 120 miles an hour. Which one of these three planes will be used on the long jump to the Pole Commander Byrd will decide after he has used them all in shorter exploration trips on the way in. The fourth plane is a General Airplanes Company monoplane, one of the first to be turned out in that concern's new plant at Buffalo. It is a small ship powered with a 110 horsepower Warner motor and will be used on short hops between bases or for reconnoitering work out of the main base on the Bay of Whales.

The first ship of the Byrd expedition to set sail for Dunedin, New Zealand, which is to be the gathering point for the expedition before the final leg to the Ross Sea, was the *City of New York,* a picturesque barque with steam auxiliary. The vessel, built of wood and purchased in Norway, is an icebreaker. She is not large—180 feet overall with cargo space for less than two hundred tons. She sailed from Hoboken about the middle of August carrying thirty of the Byrd Expedition. She cleared from Balboa early last month and is now approaching Dunedin.

A month later the *Eleanor Bolling,* formerly named the *Chelsea,* also an icebreaker and former trawler, a steam-powered six hundred ton vessel carrying tools, food and more members of the group who will remain through the Antarctic winter on the frozen land at the Bay of Whales, sailed from Norfolk, and she also is heading for Dunedin.

The whaler *Ross* houses the flying equipment. On her broad decks the four planes have been lashed under tarpaulins, and below are thousands of gallons of gasoline and fuel. All but thirteen of the personnel are on these three ships. The Commander sailed from San Pedro, the harbor of Los Angeles on another whaler, *The Larsen,* on

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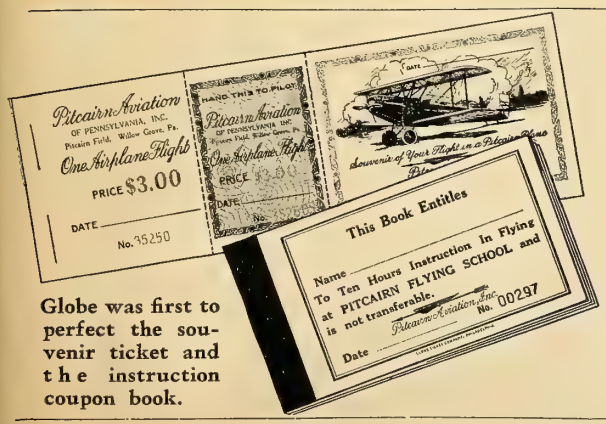
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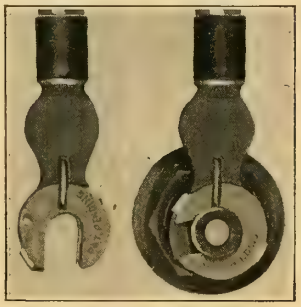
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October 10, and with him were Russell Owen of the *New York Times,* who will file the news stories of the expedition; Richard Brophy, business manager; Bernt Balchen, Dean C. Smith, veteran air mail flier, Harold I. June of the Navy and Alton Parker, formerly of the Marines, the pilots of the expedition; Ralph Shropshire, hydrographer; William Vanderveer, photographer; Martin Ronne, sailmaker, and two mechanics.

Space will not permit to list here all the members of the expedition and their varying capacities. Most of them have been assigned to double or triple duties, and already dispatches from the ships indicate that they are doing manifold things. Paul Siple, the boy scout from Erie, Pa., who signed on as Commander Byrd's orderly, is standing a watch as stoker aboard the *City of New York.* Professor Lawrence M. Gould, the geologist from the University of Michigan, has been doing the same work aboard the *Eleanor Bolling.* They all agreed before signing articles that, in addition to their particular specialties, they would turn their hands to any task that would help the expedition.

Radio is bound to play a big part in the work of the Byrd Expedition, and a station of no mean proportions is to be erected at the base to keep in touch not only with the outside world but the planes and land parties out over the Antarctic plateau. Malcolm P. Hanson, of the Naval Research Laboratory, has charge of the radio activities. He will supervise the erection of two sixty-five foot steel towers for aerials. Transmitters and receivers will be installed at each sub-base, and twenty transmitters and twenty-six receivers are being carried by the Expedition for the installation.

Mention has been made of the cost of the Byrd Expedition, but nothing has been said of how that cost is being spread. Hundreds of firms have contributed goods and instruments running in thousands of dollars in value. AERO DIGEST would like to print a complete list of these contributors to this scientific venture, but space does not permit. A few will be mentioned, however, merely to show the wide extent of industrial field from which the Byrd Expedition has drawn sustenance. The partial list together with the goods furnished follows:

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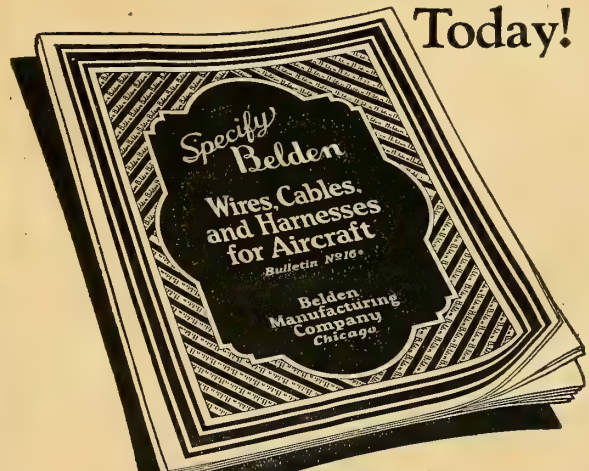
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of AERO DIGEST, published monthly at New York, N. Y., for October 1, 1928.

State of New York, } ss.
County of New York, }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Frank A. Tichenor, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the AERO DIGEST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Aeronautical Digest Publishing Corp., 220 West 42nd St., New York, N. Y.; Editor, J. E. Horsfall, 220 West 42nd St., New York, N. Y.; Managing Editor, None; Business Manager, Frank A. Tichenor, 220 West 42nd St., New York, N. Y.

2. That the owners are: The Aeronautical Digest Publishing Corp., 220 West 42nd St., New York, N. Y.; Abram Horsfall, Martinsburg, West Virginia; J. E. Horsfall, 220 West 42nd Street, New York, N. Y.; Frank A. Tichenor, 220 West 42nd St., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

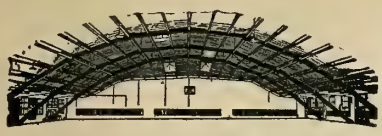
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(Signed) FRANK A. TICHENOR.

Sworn to and subscribed before me this 28th day of September, 1928.

(Signed) ANNA HIGGINS.
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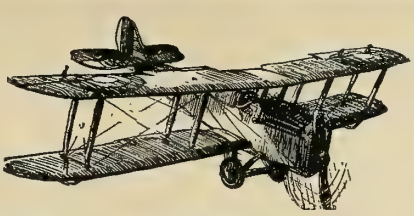
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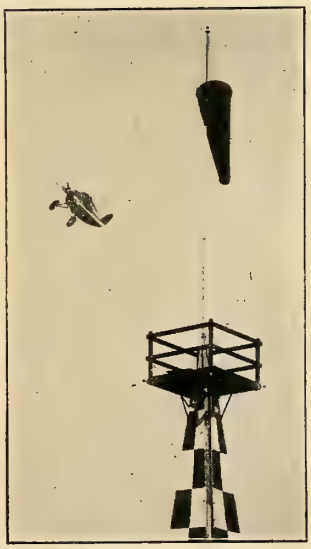
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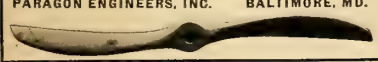
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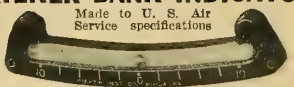
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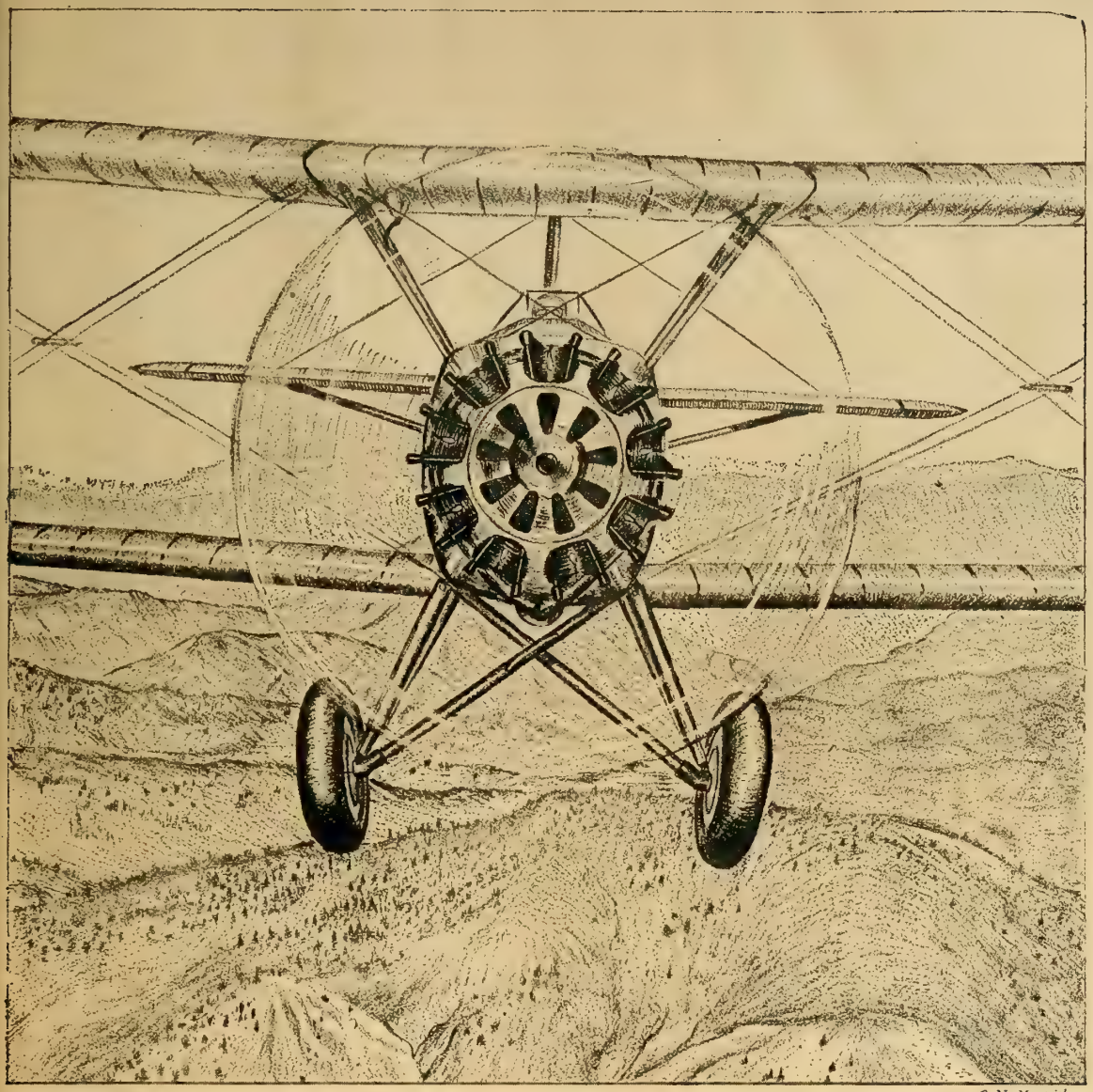
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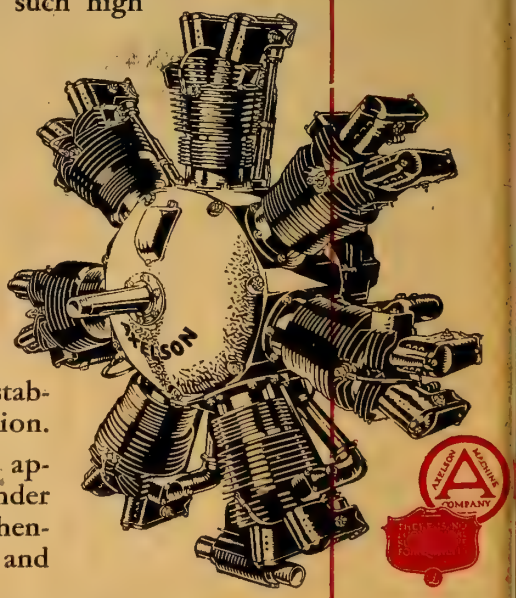
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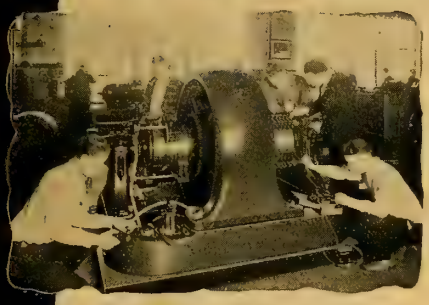
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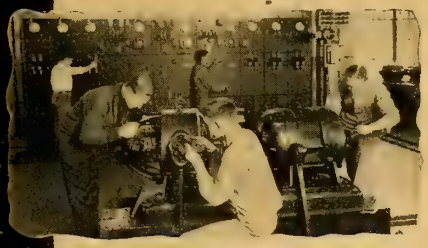
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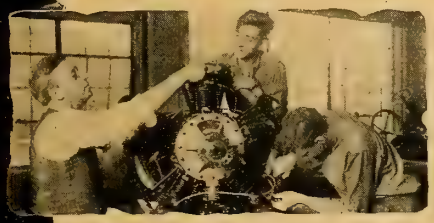
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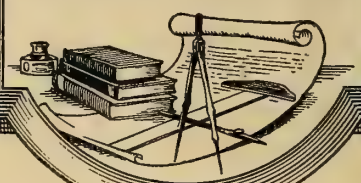
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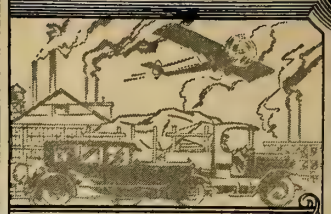
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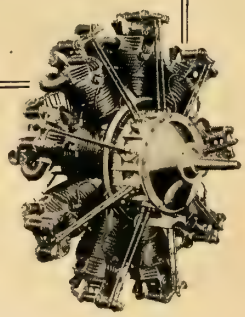
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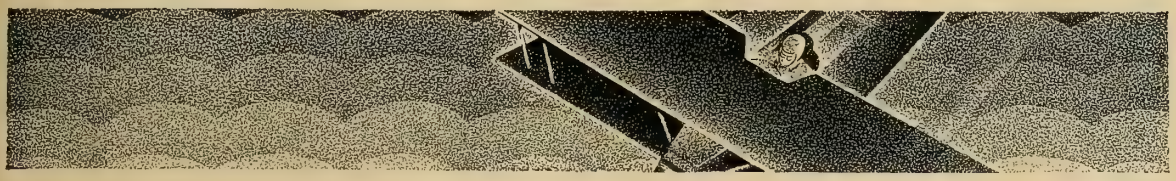
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1 *When you full-throttle along some fine Winter's day . . .*

2 *And the temperature starts looping the loop around zero . . .*



3 *And you're wearing a trick helmet that doesn't come down far enough . . .*

4 *And it leaves about an inch or so of your manly brow exposed . . .*



5 *And the cold air starts to rally around that exposed brow . . .*

6 *And your forehead becomes temperamental, developing aches and pains . . .*

Don't blame your forehead

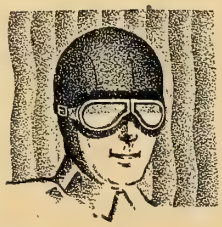
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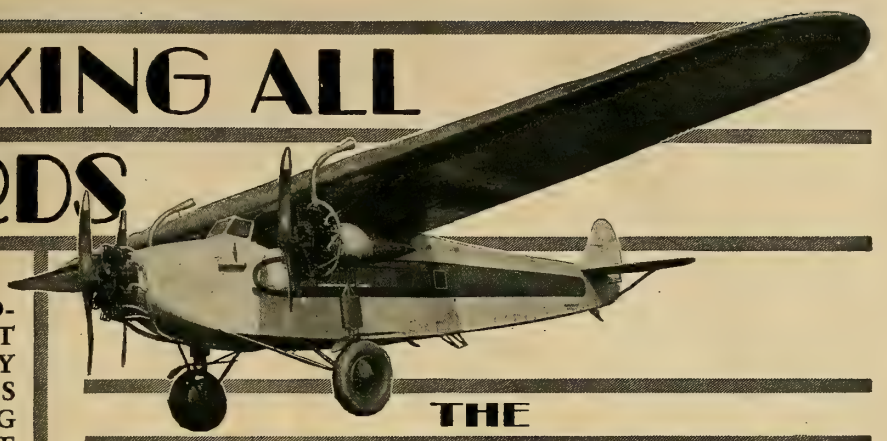
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It deals with modern aircraft engines and miscellaneous equipment, such as carburetors, magnetos, starters, aeronautic instruments, etc. It also includes types of aircraft, controls, nomenclature for aeronautics and complete information pertaining to air commerce regulations, etc. Adequate space is devoted to the Wright "Whirlwind", the "Wasp", the Curtiss, Packard (including the monster X-type 24 cylinder engine), the Fairchild-Caminez (the engine without a crankshaft or connecting rods), and other leading makes, including some of the foreign makes of engines.

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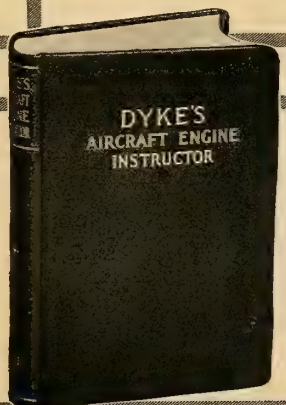
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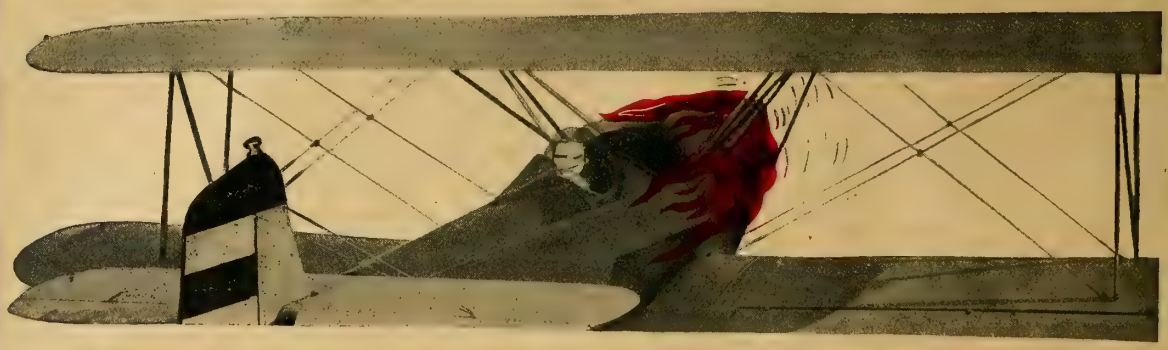
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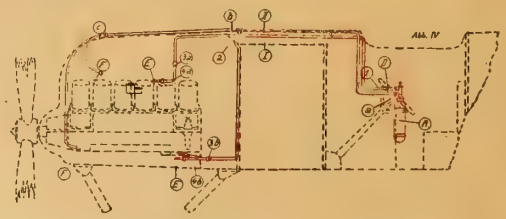
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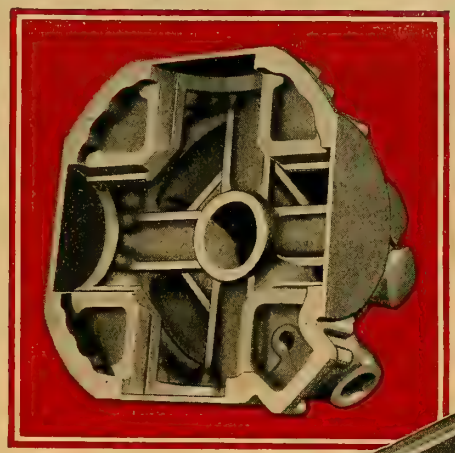
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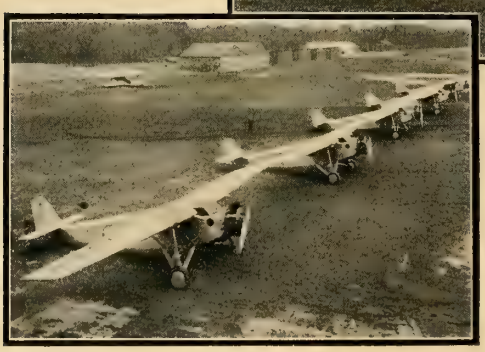
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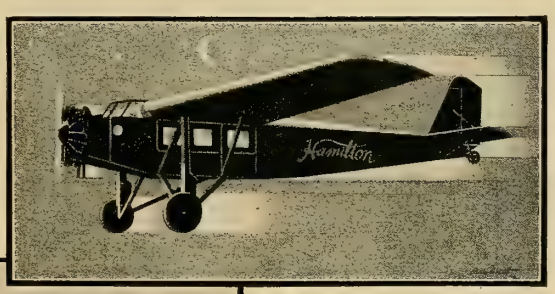
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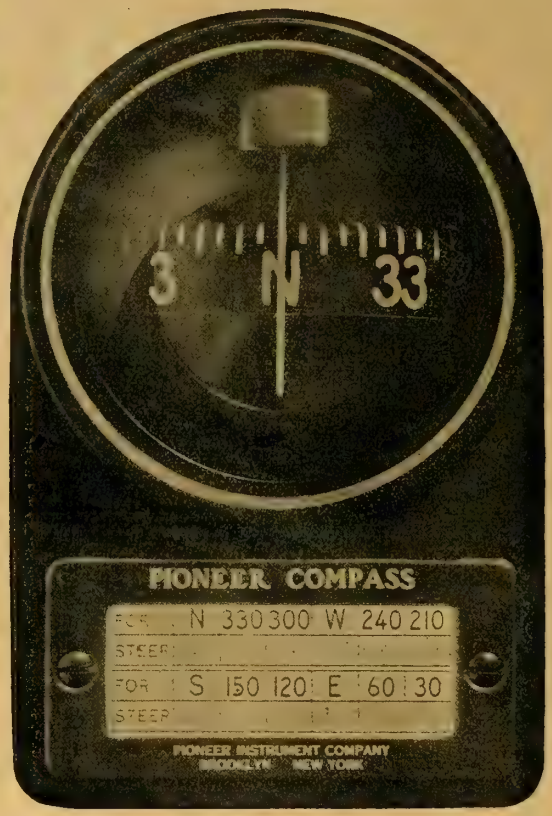
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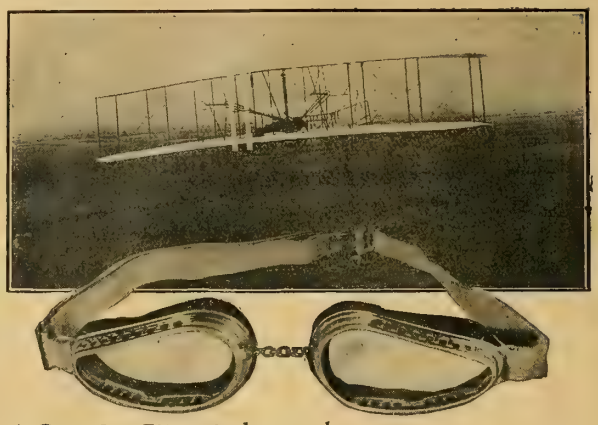
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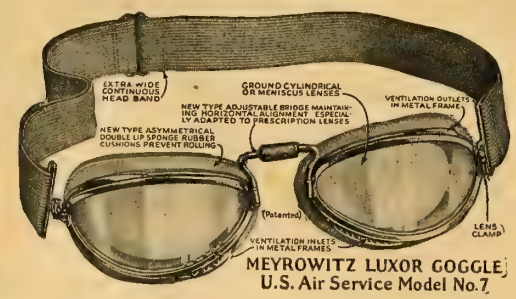
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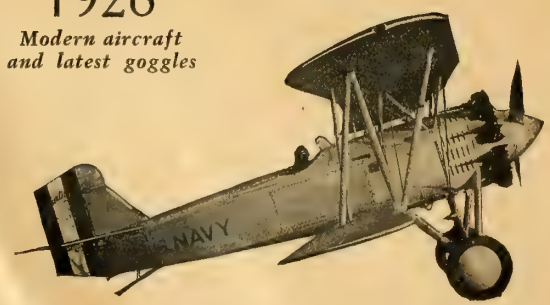
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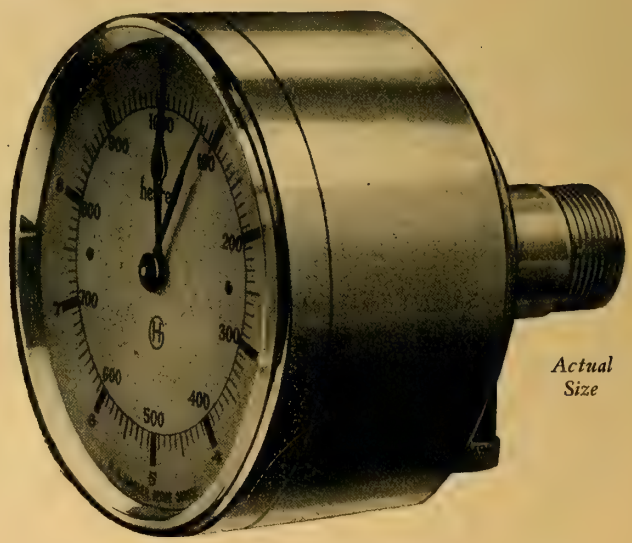
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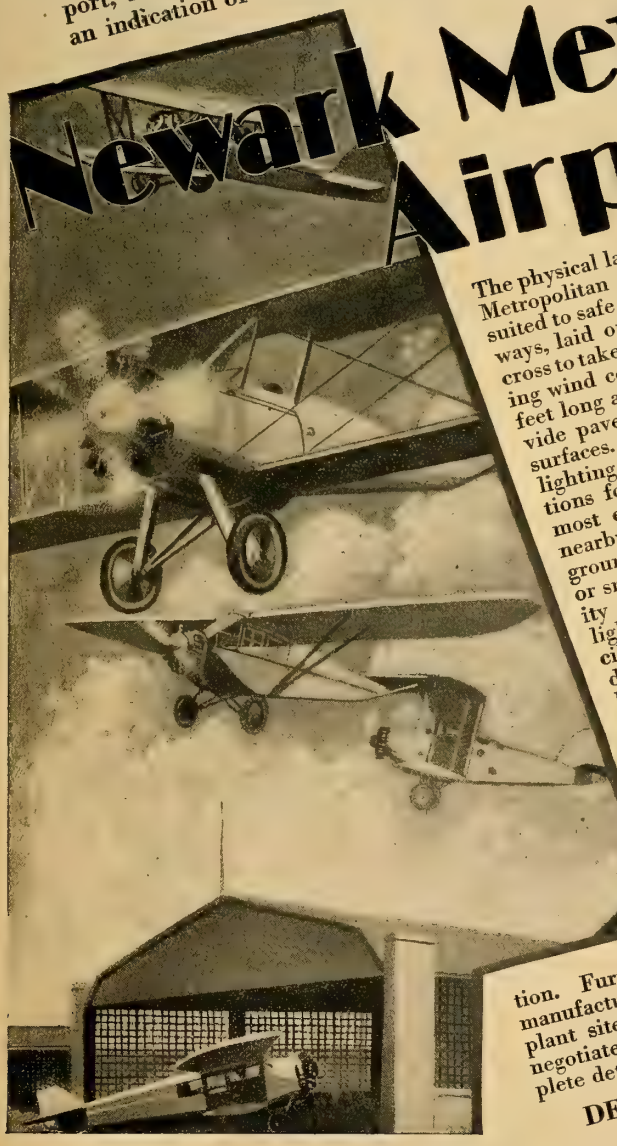
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Volume 13
No. 6

AERO DIGEST

DECEMBER
1928

THE MAGAZINE OF THE AIR

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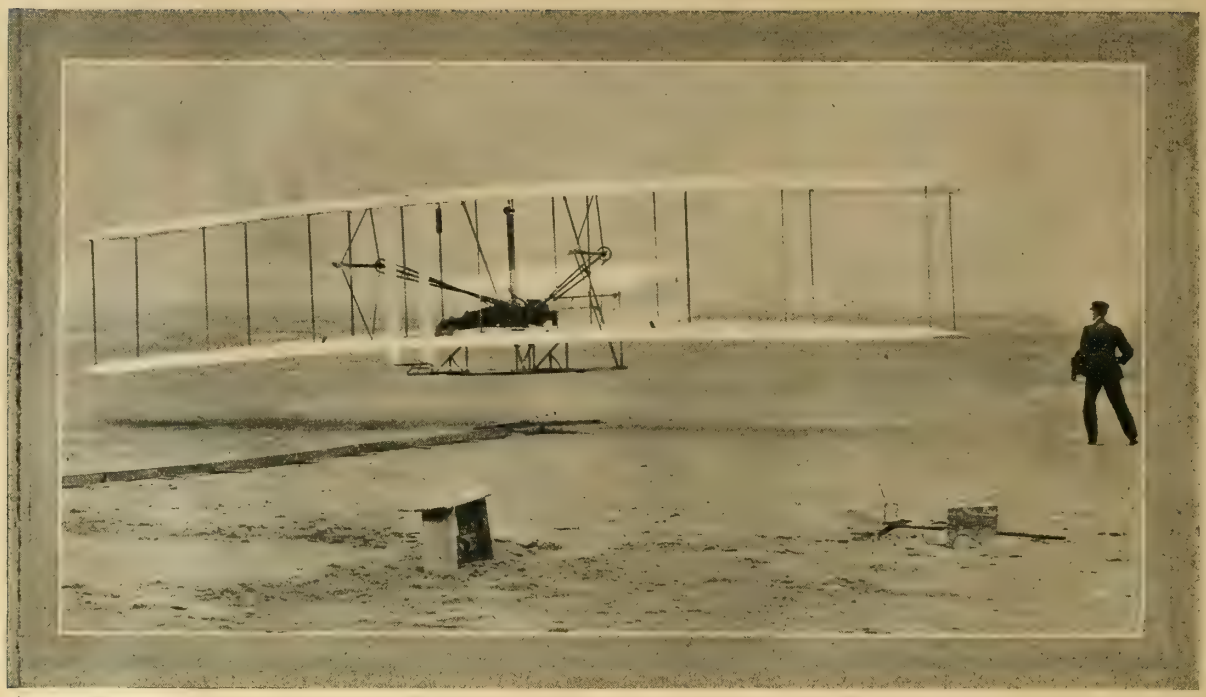
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The first flight at Kitty Hawk, North Carolina, December 17, 1903. Orville Wright at the controls, Wilbur Wright along side of the plane. In this photograph it will be seen that the machine had reached the end of the launching rail and attained a height of about three feet above the ground.





Orville Wright

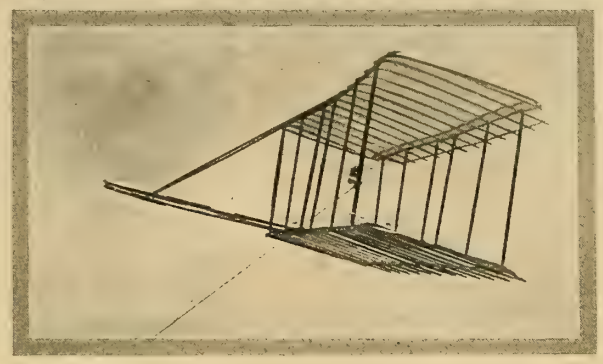
FIRST TO FLY

Wilbur Wright

THE WRIGHTS' FIRST FLIGHTS

JUST twenty-five years ago, the Wright brothers made the epochal flight which marked a new era in the experience of men. The experiments and tests which formed a foundation for their ultimate achievement show the careful planning and deliberate precision which characterized each step of their progress. Although they took up the science as a sport, they found it so fascinating they disregarded the hardships and disappointments that they encountered in the early stages of their experiments.

They studied the works of the pioneers who preceded them, and put into actual practice the knowledge they acquired therefrom. Their investigations led them to believe it feasible to build a glider which would be sustained at a speed of 18 miles per hour with reference to the wind. Consequently, it was necessary to find a locality where winds of this velocity were common. They found, according to the accepted tables of air-pressures on curved surfaces, that a machine with 200 square feet of wing-surface would be sufficient for their purpose, and that places could easily be found along the Atlantic coast where winds of 16 to 25 miles were not at all uncommon. When the winds were low, it was their plan to glide from the tops of sandhills, and when they were sufficiently strong, to use a rope for their motor and fly over one spot.



The Wright glider of 1900 being flown as a kite.

Many different methods of control had been tried by the experimenters who had been working on the problem previously. Some placed the center of gravity far below the wings, in the belief that the weight would naturally seek to remain at the lowest point. Like the pendulum, however, it tended to oscillate in a manner destructive to all stability. A more satisfactory system, especially for lateral balance, was that of arranging the wings in the shape of a broad V, to form a dihedral angle with the center low and the wing-tips elevated.

They decided after some study of the dihedral principal to try a fundamentally different idea, arranging the machine so that it would not tend to right itself, making it as inert as possible to the effects of change of direction or speed, and thus reduce the effects of windgusts to a minimum.

The method of control used by Lilienthal, which consisted in shifting the body, did not seem quite as quick or effective as the case required, so the Wrights contrived a system consisting of two large surfaces on the Chanute double-deck plan, and a smaller surface placed a short distance in front of the main surfaces in such a position that the action of the wind upon it would counterbalance the effect of the travel of the center of pressure on the main surfaces. Thus, changes in the direction and velocity of the wind would have little disturbing effect, and the operator would be required to attend only to the steering of the machine, which was to be effected by curving the forward surface up or down. The lateral equilibrium and the steering to right or left were to be attained by a torsion or bending of the main surfaces, which was equivalent to presenting one end of the wings at a greater angle than the other, thus giving it greater lift.

With these plans the brothers proceeded, in the summer of 1900, to Kitty Hawk, North Carolina, a little settlement located on the strip of land that separates Albermarle Sound from the Atlantic Ocean. Owing to the impossibility of obtaining suitable material for a machine having an area of 200 square feet, they were compelled to make it only 165 square feet in area, which, according to the Lilienthal tables, would be supported at an angle of 3 degrees from the horizontal in a wind of about 21 miles per hour. On the day that the machine was completed, the wind blew from 25 to 30 miles per hour, and they took it out for trial as a kite. They found that while it was supported with a man on it in a wind of about 25 miles, its angle was much nearer 20 degrees than 3 degrees. The system of twisting the surfaces to regulate the lateral balance was tried and found to be much more effective than shifting the operator's body. On subsequent days, when the wind was too light to support the machine with a man on it, the machine was tested as a kite, the rudders being operated by means of cords which reached to the ground.

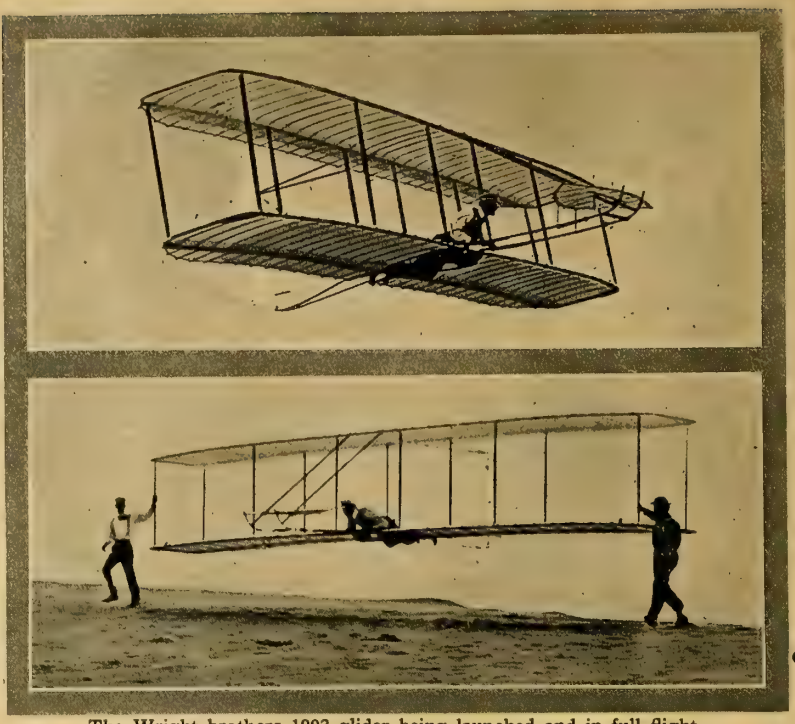


Launching the 1901 glider at Kitty Hawk

They then turned their attention to making a series of actual measurements of the lift and drift of the machine under various loads. This had never previously been done with any full-size machine. The results obtained were most astonishing, for it appeared that the total horizontal pull of the machine while sustaining a weight of 52 pounds was only 8.5 pounds, which was less than had previously been estimated for head-resistance of the framing, not including other factors.

For launching their glider, no suitable hill could be found near their camp at Kitty Hawk. They therefore took the machine to a point four miles south, where the Kill Devil sand-hill rises from the flat sand to a height of more than 100 feet. On the day of their arrival, the wind blew about 25 miles an hour, and since they had had no experience at all in gliding, they deemed it unsafe to attempt to leave the ground. But on the day following, the wind having subsided to 14 miles per hour, about a dozen

glides were made. According to their original intention, the operator was to run with the machine to obtain initial velocity and assume the horizontal position only after the machine was in free flight. When it came time to land, he was to resume the upright position and alight on his feet after the style of previous gliding experimenters. But, on actual trial, they found it better to employ two assistants in starting. The form of the machine enabled them readily to do that. It was also found to be entirely practicable to land while the operator was still reclining in a horizontal position upon the machine. Although the landings were made while moving at speeds of more than 20 miles an hour, neither machine nor operator suffered any injury.



The Wright brothers 1902 glider being launched and in full flight.

The slope of the hill was 9.5 degrees, or a drop of one foot in six feet. After attaining a speed of about 25 or 30 miles with reference to the wind, or 10 to 15 miles over the ground, the machine not only glided parallel to the slope of the hill, but greatly increased its speed, thus indicating its ability to glide on a somewhat less angle than 9.5 degrees when they should feel it safe to rise higher from the surface. The control of the machine proved even better than expected, responding quickly to the slightest motion of the rudder.

With these glides their experiments for the year 1900 closed.

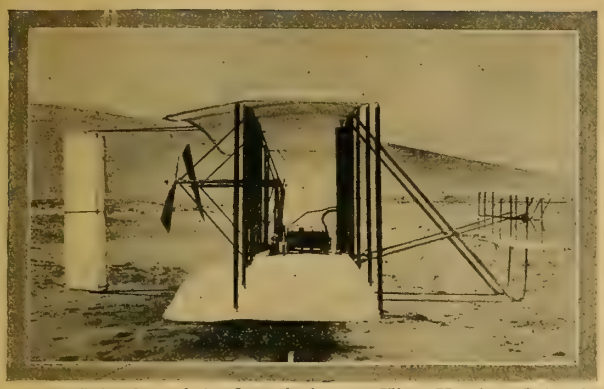
When the time came to design their new machine for 1901, the Wright brothers decided to make it exactly like the previous machine in theory and method of operation. But inasmuch as the former machine was not able to support the weight of the operator when flown as a kite, except in very high winds and at very large angles of incidence, they decided to increase its lifting power. Accordingly, the curvature of the surfaces was increased to one in twelve to conform to the shape on which Lilienthal's table was based. They decided also to increase the area of the machine from 165 square feet to 308 square feet, although so large a machine had never before been deemed controllable. The Lilienthal machine had an area of 151 square feet, that of Pilcher 165 square feet, and the Chanute double-decker 134 square feet. According to the Wrights' calculations their new machine would obtain support in a wind of seventeen miles per hour with an angle of incidence of only three degrees.

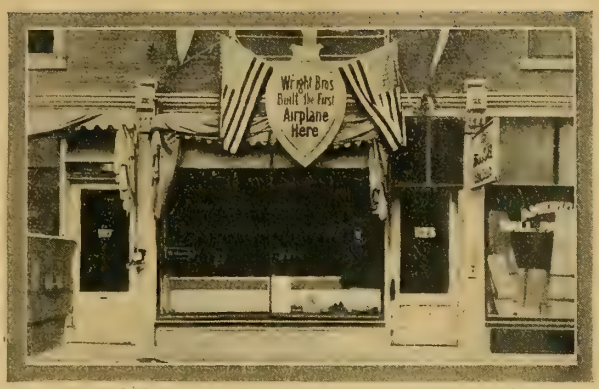


The 1903 glider, forerunner of the first airplane.

About the middle of July they went into camp and were soon joined by E. C. Huffaker, of Tennessee, an experienced aeronautical investigator in the employment of Chanute, by whom his services were lent, and by Dr. G. A. Spratt, of Pennsylvania, a young man who had made some valuable investigations of the properties of variously curved surfaces and the movements of the center of pressure thereon. Early in August, Chanute went down from Chicago to witness the experiments, and spent a week in camp with the Wrights.

The machine was completed and, in a wind blowing about thirteen miles an hour, was tried for the first time on July 27th. After the operator had taken a position near the supposed center of pressure, an attempt at gliding was made, but the machine landed after going only a few yards. On repeated trials he kept moving farther and farther back, till finally he occupied a position nearly a foot behind that at which they had expected to find the center of pressure. The machine then sailed off and made an undulating flight of a little more than 300 feet. The machine with its new curvature never failed to respond promptly to even small movements of the horizontal rudder. The operator could cause it almost to skim the ground following the undulations of its surface, or he could cause it to sail out almost on a level with the starting-point, and, passing high above the foot of the hill, gradually settle down to the ground. The wind on this day was blowing 11 to 14 miles per hour. The next day, the conditions being favorable, the machine was again taken out for trial. This time the velocity of the wind was 18 to 22 miles per hour. At first they felt some doubt as to the safety of attempting free flight in so strong a wind with a machine of over 300 square feet and a practice of less than five minutes spent in actual flight. But after several preliminary

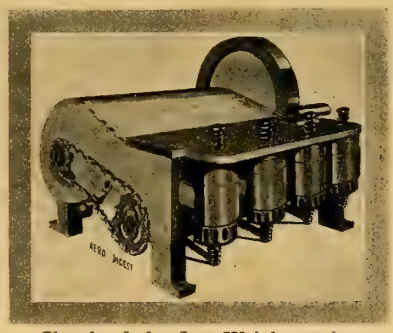




Side view of the first airplane at Kitty Hawk and the shop at Dayton, Ohio, where the plane and engine were built.

experiments, they decided to try a glide. The control of the machine seemed so good that they then felt no apprehension in sailing boldly forth. And, thereafter, they made glide after glide, sometimes following the ground closely and sometimes sailing high in the air. The highest wind thus experimented in was nearly twenty-seven miles per hour.

After their return from Kitty Hawk, they began a series of experiments to determine accurately the amount and direction of the pressure produced on curved surfaces when acted upon by winds at various angles from zero to ninety degrees. They were unable to obtain direct measurements of the horizontal pressures of the machine with the operator on board, but by comparing the distance traveled in gliding with the vertical fall, it was calculated that with a speed of twenty-four miles per hour the total horizontal resistances of their machine when bearing the operator amounted to 40 pounds, which is equivalent to about 2⅓ horsepower.

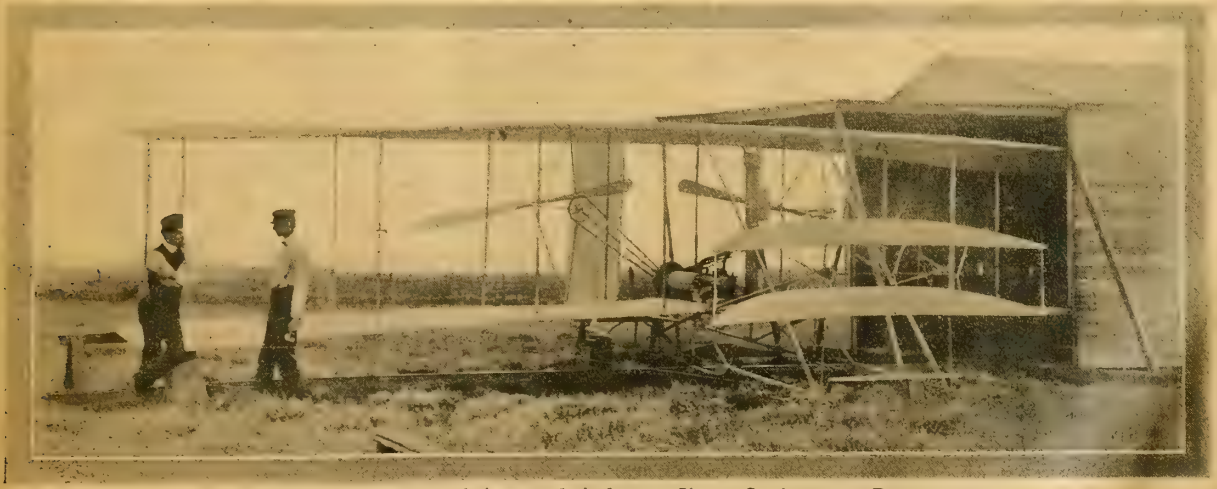


Sketch of the first Wright engine.

The 1902 design was a double-deck machine having two surfaces, each 32 feet in span, and having a 5-foot chord. The total area of the main surfaces was about 305 square feet. The front rudder had 15 square feet of area, and the vertical tail about 12 square feet, which was subsequently reduced to 6 square feet. The weight was 116½ pounds. Including the operator, the total weight was from 250 to 260 pounds. It was built to withstand hard usage, and, in nearly 1000 glides, was injured but once. It repeatedly withstood without damage the strains arising from landing at full speed in a slight hollow where only the tip of the wings touched the earth, the entire weight of machine and operator being suspended between.

The practice ground at the Kill Devil hills consisted of a level plain of bare sand from which rises a group of detached hills or mounds formed of sand heaped up by the winds. These hills are constantly changing in height and slope according to the direction and force of the prevailing winds. The three which were used for gliding experiments have heights of 100 feet, 30 feet, and 60 feet, respectively. In accordance with their custom of beginning operations with the greatest possible caution, they selected the 30-foot hill as the field of their first experiments, and began by flying the machine as a kite rather than as a man-carrying glider.

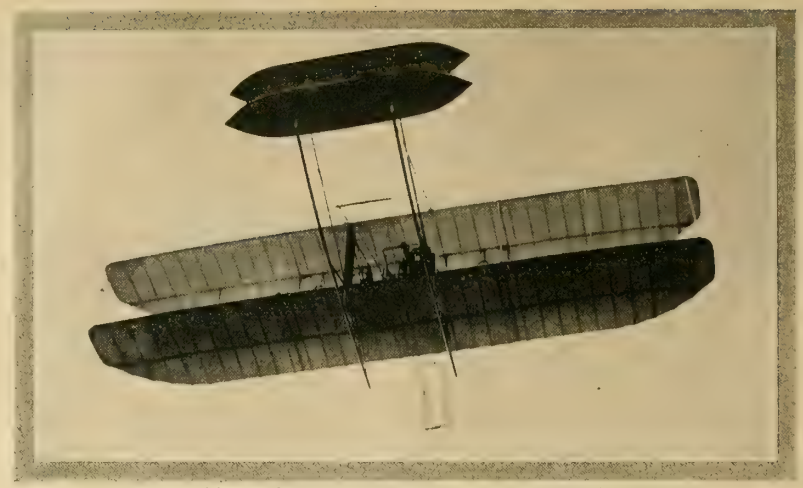
The kite experiments having shown that it ought to be possible to glide on the seven-degree slope, they next proceeded to try it. Although on this first day it was not considered advisable to venture upon any absolutely free flights, the machine soon demonstrated its ability to glide with this angle of descent. At a later period, more than a hundred flights were made the full length of this slope,



The Wright brothers and their second airplane at Simms Station, near Dayton, 1904.

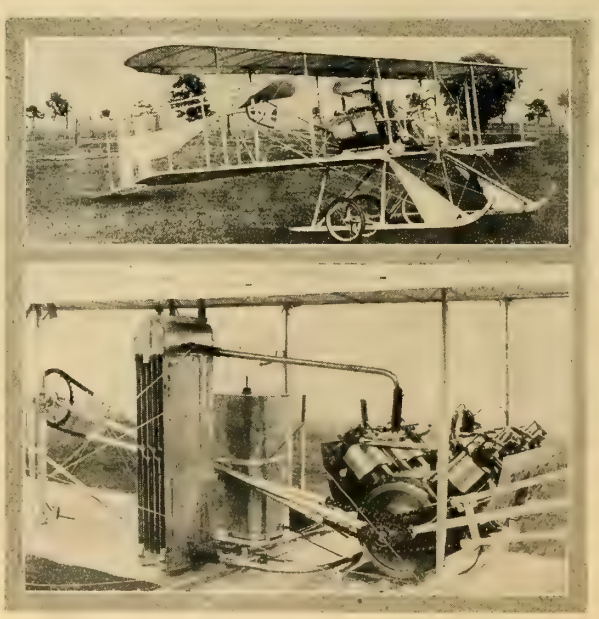
with landings a short distance out on the level stretch of ground.

In several glides there were the disturbances of the lateral equilibrium more marked than they had been accustomed to experience with the former machines. The new machine had a much greater tip-to-tip dimension than the former machines; it also had a vertical tail, while the earlier ones were tailless; and the wing-tips were on a line with the center, while the old machines had the tips drawn down like a gull's wings. The trouble might be due to any of these differences. They decided to begin alterations at the wing-tips, and the next day made the necessary alterations in the trussing, thus bringing the tips six inches lower than the center.



The military airplane demonstrated to the Army in 1908.

When the machine was taken out again for testing Orville did most of the gliding. After a few preliminary flights to accustom himself to the new method of operating the front rudder, he felt himself ready to undertake the management of the lateral control also. Shortly afterwards he started on a flight with one wing slightly higher than the other. This caused the machine to veer to the left. He waited a moment to see whether it would right itself; but finding that it did not, decided to apply the control. At the instant he did this, however, the right wing rose most unexpectedly much higher than before, and led him to think that possibly he had made a mistake. Meanwhile, he had neglected the front elevator by which the fore-and-aft balance was maintained. The machine turned up in front more and more till it assumed a most dangerous attitude. From the height of thirty feet the machine sailed diagonally backward till it struck the ground. Orville had time for one hasty glance behind him, and the next instant found himself the center of a mass of wreckage. He was not scratched or bruised anywhere, though his clothes were torn. This little misadventure, which occurred almost at the very beginning of their practice with the new machine, was the only thing approaching an accident that happened during these experiments, and was the only occasion on which the machine suffered any injury. The latter was made as good as new by a few days' work and was not again damaged in any of the hundred glides subsequently made with it.



The Wright "Baby," a successful racing type of 1910.

Nearly 1,000 gliding flights were made in September and October, 1902. Several of these flights covered distances of over 600 feet. In the Autumn of 1903, a number of flights were made with this glider in which they remained in the air for over a minute.

The Wright brothers' designs for a power-driven machine provided for a total weight of 600 pounds including the operator and an 8 horsepower engine. When the engine was built it actually gave more power than estimations had indicated as a safe minimum. This permitted adding 150 pounds for strengthening the structure. Their tables made the designing of the wings an easy matter but it was not until several months of work had passed that the various problems involved were worked out to a practical solution. Their first propellers, built entirely from their own calcu-



The hangar and field at Huffman's Prairie, near Dayton, used by the Wrights in the Spring of 1910.

lations gave a useful work of 60 per cent of the power expended.

The machine as actually constructed had a weight of 605 pounds, empty. With the pilot, the weight was 750 pounds. Engine power, 10 to 12 h. p. Weight carried per h. p., 63 pounds. Speed of engine in flight, 1,020 r.p.m. Propeller speed, 340 r.p.m. Wing span, 40 feet, 4 inches. Wing chord, 6 feet 6 inches. Total area of wings, 530 square feet. Area of vertical rudder, 20 square feet. Area of elevator, 48 square feet.

Spruce and second growth ash were used for the framework which was not painted or varnished. Unbleached muslin was used for the covering; it was not doped or treated in any way. The propellers were made of 3 laminations of spruce, each lamination about one inch thick. Propellers were painted with aluminum bronze mixed with lacquer. The tubular framework supporting the propeller shaft and chain drive was of Shelby steel, painted with black bicycle enamel.

The four-cylinder engine had a bore and stroke of 4 inches. It was built within six weeks of the time the design was started.

It was on Monday, December 14th, before the first attempt at flight could be made. The machine had been fastened with a wire to the 60-foot monorail track so it could not start until released by the operator. Wilbur made the first trial. After a run of 30 to 40 feet, it lifted from the rail. It climbed too steeply, stalled and then settled to the ground near the foot of the hill, 105 feet below. It had been in the air 3½ seconds. In landing the machine was damaged, but not seriously, and repairs were completed in two days.

On the morning of the 17th, the machine was again ready for trial. Orville's own account of the first successful flight furnishes us with the best possible narrative of the historic achievement:

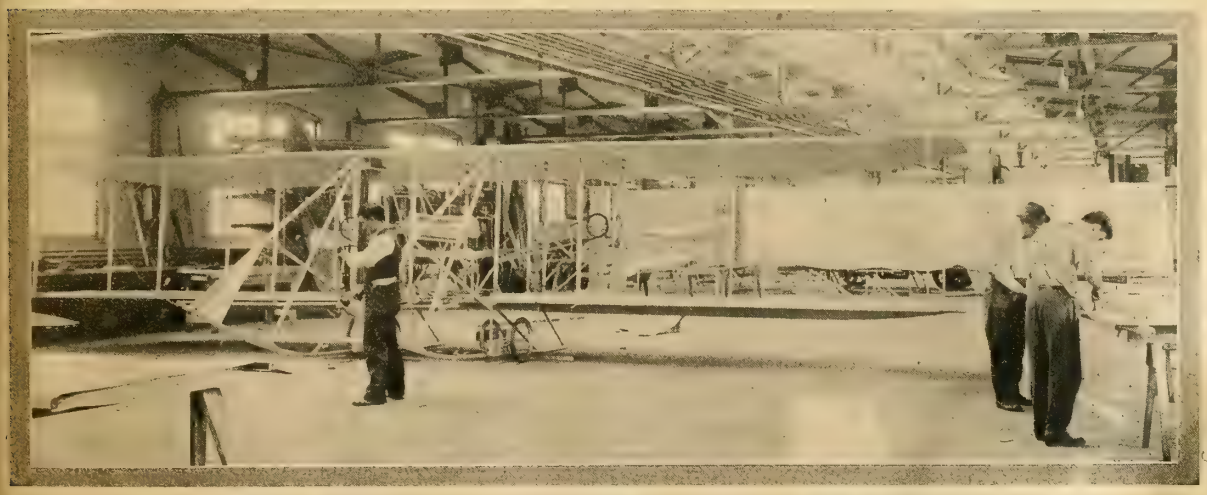


The first commercial use of an airplane. Mr. M. Morehouse and Pilot Parmalee with the bolt of silk they delivered by air from Dayton to Columbus, Ohio, in 1910.

"After running the motor a few minutes to heat it up, I released the wire that held the machine to the track, and the machine started forward into the wind. Wilbur ran at the side of the machine, holding the wing to balance it on the track. Unlike the start on the 14th, made in a calm, the machine, facing a twenty-seven-mile wind, started very slowly. Wilbur was able to stay with it until it lifted from the track after a forty-foot run. One of the life-saving men snapped the camera for us, taking a picture just as the machine had reached the end of the track and had risen to a height of about two feet.

"The course of the flight up and down was exceedingly erratic, partly due to the irregularity of the air, and partly to lack of experience in handling this machine. The control of the front rudder was difficult on account of its being balanced too near the center. This gave it a tendency to turn itself when started, so that it turned too far on one side and then too far on the other. As a result, the machine would rise suddenly to about ten feet and then as suddenly dart for the ground. A sudden dart when a little over a hundred feet from the end of the track, or a little over 120 feet from the point at which it rose into the air, ended the flight. As the velocity of the wind was over thirty-five feet per second and the speed of the machine over the ground against this wind ten feet per second, the speed of the machine relative to the air was over forty-five feet per second, and the length of the flight was equivalent to a flight of 450 feet made in calm air. This flight lasted only twelve seconds, but it was nevertheless the first in the history of the world in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed, and had finally landed at a point as high as that from which it started.

"At twenty minutes after *(Continued on page 1290)*



The Wright factory in Dayton, Ohio, where the 1910 type plane was put into production.

MODERN SIGNIFICANCE OF THE WRIGHT PATENT

By Dr. Michael Watter

THE Wright brothers' patent filed on March 23rd, 1903, is actually one of the most romantic pages in the history of aeronautical science. Examining this patent, one is impressed by their uncanny ability to anticipate events, analyze facts and draw conclusions based on no previous experience but their own observations during short glides made at the risk of their lives.

There are three main problems which are faced by all aeronautical designers: aerodynamical, structural and mechanical. It is remarkable with what simplicity and ingenuity Orville and Wilbur Wright solved the difficulties faced by them.

Fully realizing the importance of weight, they decided to use Chanute's arrangement of "aeroplanes" and resorted to a biplane cell, which is the most advantageous structural arrangement for thin airfoils. We know that they fully understood the aerodynamical disadvantage of a biplane cell, since in one of his writings Wilbur says ". . . the superposition of the surfaces somewhat reduced the lift per square foot, as compared with a single surface of equal area."

The importance of lifting profile and streamlining grasped by them led to covering both the upper and lower surfaces of their wings with cloth. Contrasting this with their attempt to save weight, one recognizes how scientifically balanced were their compromises. Aerodynamical considerations, for instance, forced them to resort to an unusual posture for the pilot ". . . it seemed reasonable that if the body of the operator could be placed in a horizontal position . . . the wind resistance could be very materially reduced, since only one square foot instead of five would be exposed."

The problem of lift was solved. Two arched, elongated "aeroplanes" with the structure hidden by covering were superimposed to form a cell, with proper bracing to insure their structural rigidity: the patent gives a detailed explanation of interplane trussing, makes mention of drag and center stagger bracing, and describes the mechanical arrangement which insured the flexibility of the cell.

These problems, however, were viewed by the two brothers as only subordinate to things of higher importance. To quote Wilbur Wright: "The difficulties which obstruct the pathway to success in flying machine construction are of three general classes: (1) Those which relate to the construction of the sustaining wings; (2) Those which relate to the generation and application of the power required to drive the machine through the air; (3) Those relating to the balancing and steering of the machine after it is actually in flight. Of these difficulties two are already to a certain extent solved. . . . Inability to balance and steer still confronts students of the flying problem, although nearly ten years have passed (since Lilienthal's success). *When this one feature has been worked out, the age of flying machines will have arrived, for all other difficulties are of minor importance.*"

Thus, fully realizing the importance of this phase of the design, they turned their attention to the problem of balance and control. There are three principal motions to contend with: pitching, yawing and rolling. Previously, restoring stability moments had been supplied by the displacement or inclination of the pilot's body, but the Wright brothers fully understood the inadequacy of such a control. For longitudinal control and stability they placed in front of the cell an auxiliary plane, the curvature and angle of attack of which could be changed at will by the pilot. The forward location is justified by aerodynamical, practical and mechanical reasons. The means of control by merely raising or lowering the trailing edge—thus changing curvature and angle of attack simultaneously—is rather ingenious for 1902, while with the vicissitudes of the first days, it was a safe precaution to have the protection afforded by the forward projecting tail surface. Lateral control was provided by warping the wings, while the yawing was checked by a vertical rudder in the rear. From the patent it is clearly evident that the Wright brothers thoroughly understood in 1902 the effects of the undesirable yawing couple which was produced in rolling, and their patent makes mention of possible desirability of what we know today as differential aileron control. To quote the patent:

"Moreover, although we prefer to so construct the apparatus that the movements of the lateral margins on the opposite sides of the machine are equal in extent and opposite in direction, yet our invention is not limited to a construction producing this result, *since it may be desirable under certain circumstances to move the lateral margins on one side of the machine just described without moving the lateral margins on the other side of the machine to an equal extent in the opposite direction.*"

Simplicity of mechanical arrangement apparently led them to use equal marginal movements and to seek other means of checking the undesirable yawing. Bitter experience taught them that if unchecked this undesirable moment might lead to serious consequences, and in describing them in their patent, they give a very vivid picture of entry into involuntary spin. The heights attained at that time were insufficient really to spin, but the circumstances described in the patent leave no doubt as to the character of the phenomenon: ". . . when the lateral margins of the aeroplanes are so turned . . . as to present different angles of incidence to the atmosphere, that side presenting the largest angle of incidence, although being lifted or moved upward in the manner already described, at the same time meets with an increased resistance to its motion, while at the same time the other side of the machine, presenting a smaller angle of incidence, meets with less resistance to its forward motion and tends to move forward more rapidly than the retarded side. *This gives the machine a tendency to turn around its vertical axis, and this tendency if not properly met will not only change the direction of the front of the machine, but will ultimately permit one side thereof to drop into a position vertically below the other side with the aeroplanes in vertical position, thus causing the machine to fall.*"

To offset the yawing moment they invented a vertical rudder located in the rear and interconnected with the lateral control in such a way that its action is fully automatic! "The movement of the rudder . . . prevents this action, since it exerts a retarding influence on that side of the machine which tends to move forward too rapidly and keeps the machine with its front properly presented to the direction of flight and with its body properly balanced around *its central longitudinal axis.*" The aerodynamical ingenuity of the Wright brothers was supplemented by

practical and mechanical foresight; the hardships of the first trials with falls and hard landings compelled them to mount the vertical rudder in such a way that it would yield under impact. Therefore, they mounted it on two parallel "Vees" which could swing upward, "thus preventing injury or breakage."

The longitudinal balance and control was effected by means of a forward horizontal tail: ". . . the rear edge of the rudder lies immediately in front of the operator and may be operated by him in any suitable manner. . . . When force is applied to the rear edge of said rudder, the longitudinal ribs bend, and the rudder presents a concave surface to the action of the wind either above or below its normal plane, said surface presenting a small angle of incidence at its forward portion and said angle of incidence rapidly increasing toward the rear. This greatly increases the efficiency of the rudder as compared with a plane surface of equal area. By regulating the pressure on the upper and lower sides of the rudder through changes of angle and curvature in the manner described, a turning movement of the main structure around its transverse axis may be effected, and the course of the machine may *thus be directed upward or downward at the will of the operator and the longitudinal balance thereof maintained.*"

The points brought out in this article are only a few, but they are sufficient to illustrate the remarkable way in which the Wright brothers conceived the airplane as it is today in its most essential parts—a cell or a wing to sustain the weight, a horizontal tail plane to balance and control the longitudinal movements, lateral control to control lateral motions, a vertical rudder to offset the dangerous moments set up by lateral control and also to steer the plane in horizontal direction. The sense of controls is unchanged today, but of course we have better mechanism of transmission and more perfect means of operation which are the results of our accumulated knowledge. They fully appreciated the importance of aspect ratio, center of pressure movement, variation of lift with change in angle of attack, and they were the first to understand that the resultant of air forces is not perpendicular to the chord but at certain angles of attack is inclined forward: ". . . therefore it is evident that the average pressure on the surface, instead of being normal to the chord, was so far inclined toward the front that all the head resistance of framing and wires used in the construction was more than overcome."

Besides points of aerodynamical, structural and mechan-

(Continued on page 1284)

SPECIFICATIONS OF THE WRIGHT PATENT, FILED MARCH 23rd 1903

To all whom it may concern:

BE it known that we, Orville Wright and Wilbur Wright, citizens of the United States, residing in the city of Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Flying Machines, of which the following is a specification.

Our invention relates to that class of flying machines in which the weight is sustained by the reactions resulting when one or more aeroplanes are moved through the air edgewise at a small angle of incidence, either by the application of mechanical power or by the utilization of the force of gravity.

The objects of our invention are to provide means for maintaining or restoring the equilibrium or lateral balance of the apparatus, to provide means for guiding the machine both vertically and horizontally, and to provide a structure combining lightness, strength, convenience of construction and certain other advantages which will hereinafter appear.

To these ends our invention consists in certain novel features, which we will now proceed to describe and will then particularly point out in the claims.

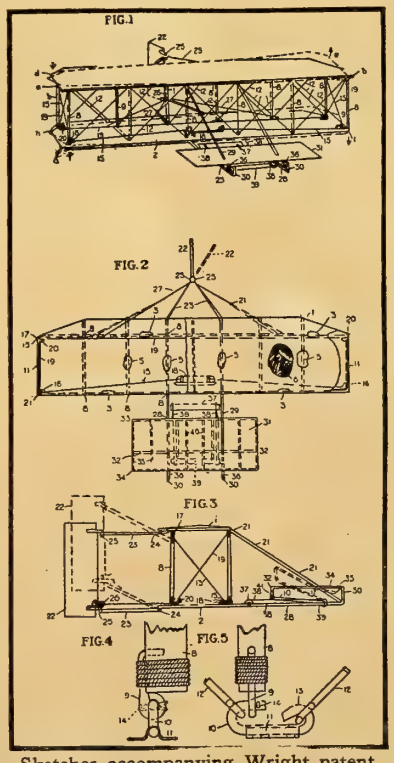
In the accompanying drawings, Figure 1 is a perspective of an apparatus embodying our invention in one form. Fig. 2 is a plan view of the same, partly in horizontal section and partly broken away. Fig. 3 is a side elevation, and Figs. 4 and 5 are detail views, of one form of flexible joint for connecting the upright standards with the aeroplanes.

In flying machines of the character to which this invention relates the apparatus is supported in the air by reason of the contact between the air and the under surface of one or more aeroplanes, the contact surface being presented at a small angle of incidence to the air. The relative movements of the air and aeroplane may be derived from the motion of the air in the form of wind blowing in the direction opposite to that in which the apparatus is travelling or by a combined downward and forward movement of the machine, as in starting from an elevated position or by combination of these two things, and in either case the operation is that of a soaring-machine, while power applied to the machine to propel it positively forward will cause the air to support the machine in a similar manner. In either case owing to the varying conditions to be met there are numerous disturbing forces which tend to shift the machine from the position which it should occupy to obtain the desired results. It is the chief object of our invention to provide means for remedying this difficulty, and we will now proceed to describe the construction by means of which these results are accomplished.

In the accompanying drawing we have shown an apparatus embodying our invention in one form. In this illustrative embodiment the machine is shown as comprising two parallel superposed aeroplanes, 1 and 2 may be embodied in a structure having a single aeroplane. Each aeroplane is of considerably greater width from side to side than from front to rear. The four corners of the upper aeroplane are indicated by the reference letters *a*, *b*, *c*, and *d*, while the corresponding corners of the lower aeroplane 2 are indicated by the reference letters *e*, *f*, *g*, and *h*. The marginal lines *a b* and *e f* indicate the front edges of the aeroplanes, the lateral margins of the upper aeroplane are indicated, respectively, by the lines *a d* and *b c*, the lateral margins of the lower aeroplane are indicated, respectively, by the lines *e h* and *f g*, while the rear margins of the upper and lower aeroplanes are indicated, respectively, by the lines *c d* and *g h*.

Before proceeding to a description of the fundamental theory of operation of the structure we will first describe the preferred mode of constructing the aeroplanes and those portions of the structure which serve to connect the two aeroplanes.

Each aeroplane is formed by stretching cloth or other suitable fabric over a frame composed of two



Sketches accompanying Wright patent.

parallel transverse spars 3, extending from side to side of the machine, their ends being connected by bows 4, extending from front to rear of the machine. The front and rear spars 3 of each aeroplane are connected by a series of parallel ribs 5 which preferably extend somewhat beyond the rear spar, as shown. These spars, bows, and ribs are preferably constructed of wood having the necessary strength, combined with lightness and flexibility. Upon this framework the cloth which forms the supporting surface of the aeroplane is secured, the frame being enclosed in the cloth. The cloth for each aeroplane previous to its attachment to its frame is cut on the bias and made up into a single piece approximately the size and shape of the aeroplane, having the threads of the fabric arranged diagonally to the transverse spars and longitudinal ribs, as indicated at 6 in Fig. 2. Thus the diagonal threads of the cloth form truss systems with the spars and ribs, the threads constituting the diagonal members. A hem is formed at the rear edge of the cloth to receive a wire 7, which is connected to the ends of the rear spar and supported by the rearwardly-extending ends of the longitudinal ribs 5, thus forming a rearwardly-extending flap or portion of the aeroplane. This construction of the aeroplane gives a surface which has very great strength to withstand lateral and longitudinal strains, at the same time being capable of being bent or twisted in the manner hereinafter described.

When two aeroplanes are employed, as in the construction illustrated, they are connected together by upright standards 8. These standards are substantially rigid, being preferably constructed of wood and of equal length, equally spaced along the front and rear edges of the aeroplane, to which they are connected at their top and bottom ends by hinged joints or universal joints of any suitable description. We have shown one form of connection which may be used for this purpose in Figs. 4 and 5 of the drawings. In this construction each end of the standard 8 has secured to it an eye 9, which engages with a hook 10, secured to a bracket plate 11, which latter plate is in turn fastened to the spar 3. Diagonal braces or stay-wires 12 extend from each end of each standard to the opposite ends of the adjacent standards, and as a convenient mode of attaching these parts I have shown a hook 13 made integral with the hook 10 to receive the end of one of the stay-wires, the other stay-wire being mounted on the hook 10. The hook 13 is shown as bent down to retain the stay wire in connection to it, while the hook 10 is shown as provided with a pin 14 to hold the stay-wire 12 and eye 9 in position thereon. It will be seen that this construction forms a truss system which gives the whole machine great transverse rigidity and strength, while at the same time the jointed connections of the parts permit the aeroplanes to be bent or twisted in the manner which we will now proceed to describe.

15 indicates a rope or other flexible connection extending lengthwise of the front of the machine above the lower aeroplane, passing under pulleys or other suitable guides 16 at the front corners *e* and *f* of the lower aeroplane, and extending thence upward and rearward to the upper rear corners *c* and *d*, of the upper aeroplane, where they are attached, as indicated at 17. To the central portion of the rope there is connected a laterally-movable cradle 18, which forms a means for moving

the rope lengthwise in one direction or the other, the cradle being movable toward either side of the machine. We have devised this cradle as a convenient means for operating the rope 15, and the machine is intended to be generally used with the operator lying face downward on the lower aeroplane, with his head to the front, so that the operator's body rests on the cradle, and the cradle can be moved laterally by the movements of the operator's body. It will be understood, however, that the rope 15 may be manipulated in any suitable manner.

19 indicates a second rope extending transversely of the machine along the rear edge of the body portion of the lower aeroplane, passing under suitable pulleys or guides 20 at the rear corners *g* and *h* of the lower aeroplane and extending thence diagonally upward to the front corners *a* and *b* of the upper aeroplane, where its ends are secured in any suitable manner, as indicated at 21.

Considering the structure so far as we have now described it, and assuming that the cradle 18 be moved to the right in Figs. 1 and 2, as indicated by the arrows applied to the cradle in Fig. 1 and by the dotted lines in Fig. 2, it will be seen that that portion of the rope 15 passing under the guide pulley at the corner *e* and secured to the corner *d* will be under tension, while slack is paid out throughout the other side or half of the rope 15. The part of the rope 15 under tension exercises a downward pull upon the rear upper corner *d* of the structure and an upward pull upon the front lower corner *e*, as indicated by the arrows. This causes the corner *d* to move downward and the corner *e* to move upward. As the corner *e* moves upward it carries the corner *a* upward with it, since the intermediate standard 8 is substantially rigid and maintains an equal distance between the corners *a* and *e* at all times. Similarly, the standard 8, connecting the corners *d* and *h*, causes the corner *h* to move downward in unison with the corner *d*. Since the corner *a* thus moves upward and the corner *h* moves downward, that portion of the rope 19 connected to the corner *a* will be pulled upward through the pulley 20 at the corner *h*, and the pull thus exerted on the rope 19 will pull the corner *b* on the other wise of the machine downward and at the same time pull the corner *g* at said other side of the machine upward. This results in a downward movement of the corner *b* and an upward movement of the corner *c*. Thus it results from a lateral movement of the cradle 18 to the right in Fig. 1 that the lateral margins *a d* and *e h* at one side of the machine are moved from their normal positions in which they lie in the normal planes of their respective aeroplanes, into angular relations with said normal planes, each lateral margin on this side of the machine being raised above said normal plane at its forward end and depressed below said normal plane at its rear end, said lateral margins being thus inclined upward and forward. At the same time a reverse inclination is imparted to the lateral margins *b c* and *f g* at the other side of the machine, their inclinations being downward and forward. These positions are indicated in dotted lines in Fig. 1 of the drawings. A movement of the cradle 18 in the opposite direction from its normal position will reverse the angular inclination of the lateral margins of the aeroplanes in an obvious manner. By reason of this construction it will be seen that with the particular mode of construction now under consideration it is possible to move the forward corner of the lateral edges of the aeroplane on one side of the machine either above or below the normal planes of the aeroplanes, a reverse movement of the forward corners of the lateral margins on the other side of the machine occurring simultaneously. During this operation each aeroplane is twisted or distorted around a line extending centrally across the same from the middle of one lateral margin to the middle of the other lateral margin, the twist due to the moving of the lateral margins to different angles extending across each aeroplane from side to side, so that each aeroplane surface is given a helicoidal warp or twist. We prefer this construction and mode of operation for the reason that it gives a gradually increasing angle to the body of each aeroplane from the centre longitudinal line thereof outward to the margin, thus giving a continuous surface on each side of the machine, which has a gradually increasing or decreasing angle of incidence from the centre of the machine to either side. We wish it to be understood, however, that our invention is not limited to this particular construction, since any construction whereby the angular relations of the lateral margins of the aeroplanes may be varied in opposite directions with respect to the normal planes of said aeroplanes comes within the scope of our invention. Furthermore, it should be understood that while the lateral margins of the aeroplanes move to different angular positions with respect to or above and below the normal planes of said aeroplanes, it does not necessarily follow that these movements bring the opposite lateral edges to different angles respectively above and below a horizontal plane, since the normal planes of the bodies of the aeroplanes are inclined to the horizontal when the machine is in flight, said inclination being downward from front to rear, and while the forward corners on one side of the machine may be depressed below the normal planes of the bodies of the aeroplanes said depression is not necessarily sufficient to carry them below the horizontal planes passing through the rear corners on that side. Moreover, although we prefer to so construct the apparatus that the movements of the lateral margins on the opposite sides of the machine are equal in extent and opposite in direction, yet our invention is not limited to a construction producing this result, since it may be desirable under certain circumstances to move the lateral margins on one side of the machine just described without moving the lateral margins on the other side of the machine to an equal extent in the opposite direction. Turning now to the purpose of this provision for moving the lateral margins of the aeroplanes in the manner described, it should be premised that owing to various conditions of wind pressure and other causes the body of the machine is apt to become unbalanced laterally, one side tending to sink and the other side tending to rise, the machine turning around its central longitudinal axis. The provision which we have just described enables the operator to meet this difficulty and preserve the lateral balance of the machine. Assuming that for some cause that side of the machine which lies to the left of the observer in Figs. 1 and 2 has shown a tendency to drop downward, a movement of the cradle 18 to the right of said figures, as hereinbefore assumed, will move the lateral margins of the aeroplanes in the manner already described so that the margins *a d* and *e h* will be inclined downward, and rearward and the lateral margins *b c* and *f g* will be inclined upward and rearward with respect to the normal planes of the bodies of the aeroplanes. With the parts of the machine in this position it will be seen that the lateral margins *a d* and *e h* present a larger angle of incidence to the resisting air, while the lateral margins on the other side of the machine present a smaller angle of incidence. Owing to this fact, the side of the machine presenting the larger angle of incidence will tend to lift or move upward, and this upward movement will restore the lateral balance of the machine. When the other side of the machine tends to drop, a movement of the cradle 18 in the reverse direction will restore the machine to its normal lateral equilibrium. Of course, the same effect will be produced in the same way in the case of a machine employing only a single aeroplane.

In connection with the body of the machine as thus operated we employ a vertical rudder or tail 22, so supported as to turn around a vertical axis. This rudder is supported at the rear ends on supports or arms 23, pivoted at their forward ends to the rear margins of the upper and lower aeroplanes, respectively. These supports are preferably V-shaped, as shown, so that their forward ends are comparatively widely separated, their pivots being indicated at 24. Said supports are free to swing upward at their free rear ends, as indicated in dotted lines in Fig. 3, their downward movement being limited in any suitable manner. The vertical pivots of the rudder 22 are indicated at 25, and one of these pivots has mounted thereon a sheave or pulley 26, around which passes a tiller-rope 27, the ends of which are extended out laterally and secured to the rope 19 on opposite sides of the central point of said rope. By reason of this construction the lateral shifting of the cradle 18 serves to turn the rudder to one side or the other of the line of flight. It will be observed in this connection that the construction is such that the rudder will always be so turned as to present its resisting surface on that side of the machine on which the lateral margins of the aeroplanes present the least angle of resistance. The reason of this construction is that when the lateral margins of the aeroplanes are so turned in the manner hereinbefore described as to present different angles of incidence to the atmosphere, that side presenting the largest angle of incidence, although being lifted or moved upward in the manner already described, at the same time meets with an increased resistance to its forward motion, while at the same time the other side of the machine, presenting a smaller angle of incidence, meets with less resistance to its forward motion and tends to move forward more rapidly than the retarded side. This gives the machine a tendency to turn around its vertical axis, and this tendency if not properly met will no only change the direction of the front of the machine, but will ultimately permit one side thereof to drop into a position vertically below the other side with the aeroplanes in vertical position, thus causing the machine to fall. The movement of the rudder, hereinbefore described, prevents this action, since it exerts a retarding influence on that side of the machine which tends to move forward too rapidly and keeps the machine with its front properly presented to the direction of flight and with its body properly balanced around its central longitudinal axis. The pivoting of the supports 23 so as to permit them to swing upward prevents injury to the rudder and its supports in case the machine alights at such an agle as to cause the rudder to strike the ground first, the parts yielding upward, as indicated in dotted lines in Fig. 3, and thus preventing injury or breakage. We wish it to be understood, however, that we do not limit ourselves to the particular description of rudder set forth, the essential being that the rudder shall be vertical and shall be so moved as to present its resisting surface on that side of the machine which offers the least resistance to the atmosphere, so as to counteract the tendency of the machine to turn around a vertical axis when the two sides thereof offer different resistances to the air.

From the central portion of the front of the machine struts 28 extend horizontally forward from the lower aeroplane, and struts 29 extend downward and forward from the central portion of the upper aeroplane, their front ends being united to the struts 28, the forward extremities of which are turned up, as indicated at 30. These struts 28 and 29 form truss-skids projecting in front of the whole frame of the machine and serving to prevent the machine from rolling over forward when it alights. The struts 29 serve to brace the upper portion of the main frame and resist its tendency to move forward after the lower aeroplane has been stopped by its contact with the earth, thereby relieving the rope 19 from undue strain, for it will be understood that when the machine comes into contact with the earth, further forward movement of the lower portion thereof being suddenly arrested, the inertia of the upper portion would tend to cause it to continue to move forward if not prevented by the struts 29, and this forward movement of the upper portion would bring a very violent strain upon the rope 19, since it is fastened to the upper portion at both ends, while its lower portion is connected by the guides 20 to the lower portion. The struts 28 and 29 also serve to support the front or horizontal rudder, the construction of which we will now proceed to describe.

The front rudder 31 is a horizontal rudder having a flexible body, the same consisting of three stiff cross-pieces or sticks 32, 33, and 34, and the flexible ribs 35, connecting said cross-pieces and extending from front to rear. The frame thus provided is covered by a suitable fabric stretched over the same to form the body of the rudder. The rudder is supported from the struts 29 by means of the intermediate cross-piece 32, which is located near the centre of pressure slightly in front of a line equidistant between the front and rear edges of the rudder, the cross-piece 32 forming the pivotal axis of the rudder, so as to constitute a balanced rudder. To the front edge of the rudder there are connected springs 36, which springs are connected to the upturned ends 30 of the struts 28, the construction being such that said springs tend to resist any movement either upward or downward of the front edge of the horizontal rudder. The rear edge of the rudder lies immediately in front of the operator and may be operated by him in any suitable manner. We have shown a mechanism for this purpose comprising a roller or shaft 37, which may be grasped by the operator so as to turn the same in either direction. Bands 38 extend from the roller 37 forward to and around a similar roller or shaft 39, both rollers or shafts being supported in suitable bearings on the struts 28. The forward roller or shaft has rearwardly-extending arms 40, which are connected by links 41 with the rear edge of the rudder 31. The normal position of the rudder 31 is neutral or substantially parallel with the aeroplanes 1 and 2; but its rear edge may be moved upward or downward, so as to be above or below the normal plane of said rudder through the mechanism provided for that purpose. It will be seen that the springs 36 will resist any tendency of the forward edge of the rudder to move in either direction, so that when force is applied to the rear edge of said rudder the longitudinal ribs 35 bend, and the rudder thus presents a concave surface to the action of the wind either above or below its normal plane, said surface presenting a small angle of incidence at its forward portion and said angle of incidence rapidly increasing toward the rear. This greatly increases the efficiency of the rudder as compared with a plane surface of equal area. By regulating the pressure on the upper and lower sides of the rudder through changes of angle and curvature in the manner described a turning movement of the main structure around its transverse axis may be effected, and the course of the machine may thus be directed upward or downward at the will of the operator and the longitudinal balance thereof maintained.

Contrary to the usual custom, we place the horizontal rudder in front of the aeroplanes at a negative angle and employ no horizontal tail at all. By this arrangement we obtain a forward surface which is almost entirely free from pressure under ordinary conditions of flight, but which even if not moved at all from its original position becomes an efficient lifting-surface whenever the speed of the machine is accidentally reduced very much below the normal, and thus largely counteracts that backward travel of the centre of pressure on the aeroplanes which has frequently been productive of serious injuries by causing the machine to turn downward and forward and strike the ground head-on. We are aware that a forward horizontal rudder of different construction has been used in combination with a supporting surface and a rear horizontal-rudder; but this combination was not intended to effect and does not effect the object which we obtain by the arrangement hereinbefore described.

We have used the term 'aeroplane' in this specification and the appended claims to indicate the supporting surface or supporting surfaces by means of which the machine is sustained in the air, and by this term we wish to be understood as including any suitable supporting surface which normally is substantially flat, although, of course, when constructed of cloth or other flexible fabric, as we prefer to construct them, these surfaces may receive more or less curvature from the resistance of the air, as indicated in Fig. 3.

We do not wish to be understood as limiting ourselves strictly to the precise details of construction hereinbefore described and shown in the accompanying drawings, as it is obvious that these details may be modified without departing from the principles of our invention. For instance, while we prefer the construction illustrated in which each aeroplane is given a twist along its entire length in order to set its opposite lateral margins at different angles, we have already pointed out that our invention is not limited to this form of construction, since it is only necessary to move the lateral marginal portions, and where these portions alone are moved only those upright standards which support the movable portion require flexible connections at their ends.

(The above description of their invention is followed by a formal summary of their claims in application for a letters patent.—Ed.)

(Signed) **Orville Wright**
Wilbur Wright

Witnesses:
Chas. E. Taylor
E. Earle Forrer



LINKING RAIL AND AIR TRANSPORT

By
W. W. Atterbury
President, Pennsylvania Railroad

THE idea of using airplanes for the commercial transportation of passengers is not new to the Pennsylvania Railroad management. We have been studying air transport for a number of years and with particularly close interest and attention in view of the impetus which commercial aviation has received since the close of the World War. During the last five years, several of our best equipped officers have been definitely assigned to watch the progress and development of air transport in America, with a view to the possible use of airplanes in connection with our train operation, or in a separate transportation service.

I received my first definite impression that airplanes could be used for commercial passenger service while serving in France as Director General of Transportation of the American Expeditionary Forces. Often during my army days I wished for airplanes capable of providing an auxiliary transportation service to be used in rushing troops and supplies to points where they were most needed. So great was the demand for speed and expeditious transportation during those trying times, and so tremendous would have been the contribution of an extremely quick and dependable transportation agency to the winning of the war, that the potential value of such an aircraft service was brought home to me most strongly and impressively. With the coming of peace, I recognized that aviation was certainly destined to become a most valuable ally of commercial railroading if it were properly handled.



W. W. Atterbury.

Our studies in air transportation have, of course, been greatly influenced by the really marvelous development of the air mail lines in the United States and the operation of regularly scheduled and dependable passenger-carrying airlines over the continent of Europe. The air mail lines were of great value to us in that they afforded a practical demonstration of just what could be accomplished in this country. The success attending the operation of the European lines, and their tremendous growth and expansion, brought home to us most vividly the vast and even more attractive possibilities of similar service in the United States. It may be of interest here to note that, since 1920, travel on the German airlines has multiplied 32½ times, and on Dutch lines 26½ times; while England and France also reveal large increases in air travel.

After reviewing the situation very carefully, we decided early this year that the time was ripe for the inauguration of air passenger service in the United States. It was felt that conditions in America were peculiarly adaptable to air transportation, and that there had developed a very real public demand for such service. In the first place, the great distances which must be covered in going from East to West or from North to South in this country afford the airplane the maximum of opportunity to demonstrate its usefulness in the field for which it is best adapted commercially; that is, in materially shortening long, tedious journeys involving many hundreds of miles of travel. Then, too, the fast moving highly organized life of America, particularly in business, would seem to provide a vast potential market for a high speed, time-saving, yet regular and dependable air service. It is noticeable in this connection that many of the passengers carried on the European airlines are Americans, showing that our people undoubtedly will patronize an air service which is efficiently operated and in which they have confidence.

Another point to be considered is the fact that the American people have the money with which to pay the higher

rates required by air transportation. This is borne out by the popularity of our high speed deluxe extra-fare railroad passenger trains. Most of the travel between New York and Chicago and other large centers in our country is on these trains, showing that the American people are willing to pay for speed and refinements in service.

The idea of operating a joint rail-air service was the natural and logical outcome of our studies in air transportation. We wanted to develop a service in which passengers could have confidence and which could be regularly and dependably operated in all seasons and under every condition of weather. We wanted nothing experimental or visionary. The combination of the railroad train and airplane, with all night journeys made by train, seemed to afford the ideal service under present conditions.



The latest Model 4-AT Ford.

The Transcontinental Air Transport, Inc., was formed to bring to function these ideas and to place in actual operation a service such as we had visualized. As has already been announced, this new company, in which the Pennsylvania Railroad is financially interested, will establish next spring a coördinated rail-air route between New York and Pacific Coast cities.

In addition, at a later date, not yet definitely fixed, a supplementary through all-air service will be established between Columbus and the Pacific Coast cities, involving night flying. This will afford a still faster trip to passengers requiring the maximum saving of time.

The route selected offers the nearest approach to ideal flying conditions that the country affords. Landing fields are being selected with the utmost care. The planes will be of the most approved type and will be operated by the most highly skilled and expert pilots that can be retained. These factors insure a maximum of safety, comfort and convenience to passengers. With the opening of the route, we will be prepared to offer the public a transcontinental service of superior speed, which will merit the confidence and faith of patrons in equal degree with that which has traditionally been bestowed upon standard American passenger train service of the highest grade.

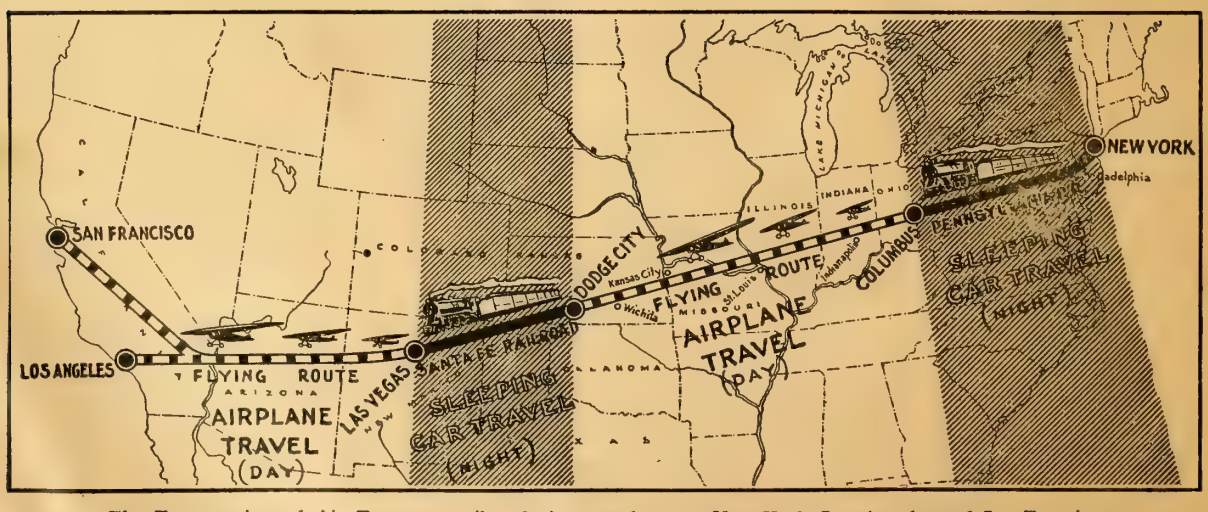
To secure the very best advice available in the conduct of its operations, the air company engaged the services of Colonel Charles A. Lindbergh as Chairman of the Technical Committee. He has complete charge of the selection of equipment, flying personnel, routes, landing fields, schedules, etc. The operations of the new line will be checked and approved by him in every detail before passengers are accepted for transportation. Colonel Lindbergh also has been retained as Consulting Aeronautical Engineer to the Pennsylvania Railroad. We felt the need of his expert advice and wide and varied experience for carrying on the rapidly expanding air transport activities of our company. Other widely known figures in the flying world who have been retained as members of the Technical Committee, headed by Colonel Lindbergh, are Lieutenant C. S. (Casey) Jones and Major Thomas G. Lamphier.

Operations will be commenced with the most modern American aircraft. These will be trimotored, all-metal Ford planes, equipped with Pratt and Whitney Wasp engines, carrying twelve passengers each. Each plane will be manned by a pilot, mechanic and steward. Both the mechanic and steward will be capable of flying the ship. The steward will look after the comfort and convenience of passengers and be of general assistance. Every device known to the art of airplane construction will be embodied in the equipment of these ships, including complete apparatus for radio transmission and reception.

A safety feature of the service will be the establishment of weather reporting stations every fifty miles along the line of flight, so that pilots will be informed by radio of weather conditions within a radius of fifty miles, throughout the entire route. These arrangements will make it possible for the pilot always to know just what weather he will be called upon to face.

The landing fields will be especially designed and equipped to afford every comfort and convenience to the traveling public. They will be located wherever possible along the railroad right-of-way.

Tickets for the air journeys will be sold in conjunction with railroad transportation. *(Continued on page 1120)*



The Transcontinental Air Transport rail and air route between New York, Los Angeles and San Francisco.

AIR—HOT AND OTHERWISE

Please! Mr. President-Elect!!
More Good News
We Need Him in Washington

By Frank A. Tichenor

OF course there will be many changes down in Washington as the result of the election, and we hope (we even have reason to believe and for this shall offer special thanks while we are eating Christmas goose presently) that certain among them will clear the air, encourage the air-minded and give air-ambitious, real air experts control in the national cockpit.

Why not? We have an air-minded president, or shall have after the fourth of March, and this shall be the first great nation in the world's history to be headed by a man really wise with regard to aviation. There aren't very many in the upper strata of the world's political atmosphere. Even Mussolini would miss, side-slip and crack up if stacked against our Herbert Hoover in competitive examination with regard to aeronautics. For Calvin Coolidge we have ever felt the most profound respect, but it is our prediction that, as far as leadership in air progression goes, whatever he has earnestly and appreciatively done will compare with that which Herbert Hoover will do later as the flying of a 1903 glider compares to the performance of some of our 1928 aeronautical creations.

Commercial aviation in America, as well as the air forces of both Army and Navy, is now sure of at least four and probably eight years of magnificent coöperation from the Executive Branch of the National Government.

It is to be expected that omissions from the Hoover cabinet will be almost as important as new appointments. How the bumpiness will vanish from the air above the capital, the Navy and even the great House called White when Wilful Wilbur tailspins into that appropriate oblivion which doubtless will be nice for him and for which the nation should hold special services of thanks in all its airdromes.

In England much has been accomplished by way of bettering local and national spirit through the medium of community singing. We should introduce the custom here for this occasion.

Then, in recognition of the election of Herbert Hoover and the nature of the appointments he will doubtless make —we shall exclaim—all . . . together . . . SING.

"Praise. . . "

You know the rest.

There will be, as well as a new cabinet appointment, a new appointment as chief of the Bureau of Aeronautics. Herbert Hoover, President-elect of the United States and the District of Columbia, is, we believe, as nearly 99-99/100 per cent air-minded as the advertised soap is pure. Those of us who know the Admiral and how valiantly he has fought during the past seven years so that the Bureau of Aeronautics might progress, feel that President Hoover easily could make a greater error than the selection of William Adger Moffett as Secretary of the Navy.

As an engineer the President-elect would be unlikely to select a warehouse architect to do a mining job. The logic is obvious of appointing as Secretary of the Navy the man who was responsible for the creation of the Bureau of Aeronautics and who, during the war, had the initiative to go out and secure contributions from individuals in order that he might conduct (for the benefit of this Government) a school for aeronautical mechanics at the Great Lakes Station, and who possesses besides this energetic enthusiasm, all the other necessary qualities of real expertness.

Surely this man, who really is informed not only with regard to surface naval fighting ships but is an expert in aeronautics as well, would show a very super-Wilbur wisdom in conducting the affairs of that immense department which, having devoted generations to the development of one form of fighting instrument, must now become pre-eminent both in its equipment with and handling of another infinitely more advanced and tricky fighting implement or leave the nation open to attack.

But we wish to speak in more emphatic praise of Admiral Moffett than would be entailed in stating the too obvious truth that he would be a great improvement upon Wilful Wilbur. He is the only individual in our whole Naval personnel bearing the exalted title of rear admiral who knows both the old and new style fleets; who is familiar with and certain to be fair in the adjustment of both sides of the controversy. He is an astounding mental and Naval phenomenon—a man with an old timer's knowledge and a new timer's enterprise and get-up-and-get-ishness.

In the opinion of AERO DIGEST and the whole air group it would be almost criminal to take Admiral Moffett away from the Bureau of Aeronautics unless it were to make him Secretary of the Navy. No movement except up must be made from this position by the able Admiral Moffett.

LAST month we devoted a few words to the big business merger manifestations recently so noteworthy in aeronautical industry. As we wrote last month, another constructive merger was in the making—the Keystone-Loening combination. This, supplemented by the still more recent announcement that Walter Beech and Travel Air have been taken into the passenger list of what promises to be one of the outstanding factors in our fast growing industry, is more good big news.

All this means that fine minds are entering the seats of the mighty in American aeronautics. Richard Hoyt is the wide thinker who has conceived this latest big progression and who will be at its head. Mr. Hoyt gained his first knowledge of the possibilities of the aircraft industry, after he already had become one of the ablest of the younger figures in the American financial world, when he was called to serve as an assistant to Col. J. J. Vincent during the World War.

As Chairman of the Board of the Wright Aircraft Corporation he naturally has kept closely in touch, not only with all actualities, but with future possibilities. In 1926 he joined up with E. N. Gott and became chairman of the Keystone Aircraft Corporation.

Gott is another man to keep your eye on. He, also, came out of the West, having been associated with E. N. Boeing. He fits perfectly into the picture.

Here is a group, including the Loenings, which is well equipped to compete in the market as builders of military and transport planes, such planes, for example, as the new Patrician. Now that Travel Air is added to the combination, it will be a serious contender in every branch of the aeronautical industry.

TWEET! Tweet! Tweet! Little birds whose habitat is a certain tree in Washington are chirping of the probability that Secretary

(Continued on page 1284)

THE AIR MAIL PILOT

By

by Caldwell

DURING all of that dull winter day the northwest wind had been driving the snow-heavy clouds across the skyscrapers of lower Manhattan. Now, with the coming of dusk, the clouds seemed to drop lower, to become darker and darker, to lose their individual contours until they merged finally into one solid blanket that shut out the last pale light of day. Intermittently during that day a fine dry snow, driven by the wind, had whirled between the buildings to fall on the pavement where rolling tires and hurrying feet had ground it into slush. It was as though Man and his inventions had triumphed to that small extent over Nature, turning one of her most beautiful manifestations into something merely to be walked on.

Dusk merged quickly, almost imperceptibly, into night. Now, cutting like a river through its canyon of massive stone, lower Broadway reflected the light of its street lamps as though from the surface of a dark stream—a stream alive with traffic, homeward bound. Viewed from above the thousands of motor cars resembled chunky, miniature boats gliding along on that glistening surface; while the hurrying pedestrians on the sidewalks seemed of no greater size and of no more importance than ants scurrying along the banks of a river.

New York, on a stormy winter night! The glistening, wind-swept streets, the lights shining dimly through their haloes of driven snow, the snow flakes blazing like myriads of diamonds in the headlights of the slowly-moving cars; horns sounding, whistles blowing, the gongs of street-cars clanging impatiently, and, like the steady pulsating undertones of a great symphony, the milling thousands hurrying home. Home! Home and comfort and warmth and light! Kindly wives greeting tired husbands; play-weary children greeting fathers, and older sisters and older brothers; young men hastening, eager and happy, to the welcome of one who shyly waits. New York is going home. Home to dinner, to rest or to play, for New York's work is done.

But now into the emptying buildings come the men in grey, gathering the last of New York's mail. All of that day down chutes of glass, from twenty, thirty, forty stories above the street, the white envelopes have been falling. Falling all day to be gathered into bags and taken to the post office. Now the last of that stream of mail is being gathered and taken away to a huge building where clerks in shirt sleeves, with green shades above their eyes, are sorting it rapidly. The white envelopes, if you watch them long enough gliding so swiftly between clever fingers, will blur at last into white flakes—not unlike the flakes that are falling now so steadily from the menacing blackness above New York.

Into bags they go, those thousands and thousands of letters; the bags into cases; the cases into the pneumatic tubes that whirl them on beneath the streets to the Pennsylvania Station. New York's messages are on their way, first under ground, then by electric train under a river,



National Air Transport pilots.

(Left to right, top row)—Paul J. Kaniut, (1225 total flying hrs.); E. C. Rockwood, (835 total flying hrs.); Edmund Matucha, (3568 hrs.); Paul E. Johnson, (3615 hrs.); Charles E. Peeples, (5290 hrs.); J. Ordway Webster, (4286 hrs.); Robert Radoll, (2353 hrs.) (2nd row)—George B. Grogan, (2398 hrs.); James D. Cleveland, (1125 hrs.); H. P. Little, (1727 hrs.); Dorsey A. Askew, (4636 hrs.); Robert Coulter, (1050 hrs.); Henry J. Brown, (4129 hrs.); Lou Foote, (1250 hrs.); (3rd row)—Lewis M. Gravis, (515 hrs.); Thomas P. Nelson, (2178 hrs.); Leonard L. Lewis, (1661 hrs.); Robert P. Hopkins, (1276 hrs.); E. D. Woodgerd, (1847 hrs.); Lawrence H. Garrison, (6163 hrs.); Robert M. DeWald, (2560 hrs.); (4th row)—Paul F. Collins, (5744 hrs.); Daniel E. Lindsey, (632 hrs.); Harry C. Lewis, (390 hrs.); Elliot E. "Dutch" Underhill, (2488 hrs.); R. L. Dobie, (4886 hrs.); Warren D. Williams, (5448 hrs.); Harold L. Knoop, (1453 hrs.); (bottom row)—J. B. Story, (900 hrs.); Walter J. Addems, (3033 hrs.); W. L. Smith, (5114 hrs.); Samuel J. Samson, (780 hrs.); Leo J. McGinn, (2790 hrs.); Frank H. Burnside, (5803 hrs.); and E. P. Lott, (2500 hrs.).



Thompson Aeronautical Corporation airline pilots.

(Left to right, top row)—Ralph R. De Vore, (4000 total flying hrs.); Lester F. Bishop, (5500 total flying hrs.); F. A. Jones, (1200 hrs.); (bottom row)—George W. Hill, (2000 hrs.); R. C. "Tex" Marshall, (6500 hrs.); C. P. "Ole" Oleson, (3000 hrs.); C. W. March, (1500 hrs.).

then across the Jersey Meadows to a little city, where they are loaded into trucks and carried along dark roads to a lighted field.

It is clearer here. The snow has almost ceased falling; only a few flakes glisten at intervals in the truck's headlights; and the wind is dropping, too. The mail will go through.

The plane is standing near the hangar, its motor ticking over. As the truck drives up to it and the mail is loaded aboard, the pilot comes from the operations office. His heavy fur-lined boots crunch through the light snow; but as he walks nearer to the plane, the sound of his footsteps is drowned in the steady rumble of the motor. No longer is he an individual, crunching through the snow; he is a blurred figure, walking soundlessly toward the plane. He clambers into the cockpit, sinks almost out of sight, and becomes a part of that strange mechanism that is to roar its way through the night to carry New York's word across a continent.

Now the motor roars into full power, the blue flames from the exhausts stabbing into the darkness; it dies down, two mechanics pull the chocks from before the wheels, and the plane lumbers out across the lighted field and turns into the wind. The motor, muffled now by distance, starts up its steady musical sound, like the lower notes of a huge organ. The plane gathers speed, leaves the ground, and —almost before we are aware of it—has climbed up into the darkness. For yet a little while we hear it, the sound growing fainter and fainter in the distance until at last there is silence, broken only by the scuffling feet of two mechanics walking back to the lighted hangar.

But there is no silence in the great city to the northeast; no silence and no darkness there while the lone air mail pilot speeds across Kittatinny Mountain and Broad Mountain, and crosses the Susquehanna beneath low-hanging clouds. In New York there is only noise and light as the people relax from the labors of the day. Fathers are reading their papers or listening to the radio; mothers are sighing their relief as they put the children to bed; somebody's sons are making love to somebody's daughters; movie morons are watching fanciful shadows on a screen—and believing them real. Cars are rolling along the streets, subway trains are roaring underground, carrying New York's restless millions to rest or to play. Light and noise; and never a thought of the cloud-filled winter sky; never a thought of the man who is carrying New York's messages across America at a hundred miles an hour. New York is in for the night—or out for the night.

Mr. Ginsberg, for instance, is out for the night—and what a night it is proving to be! Mr. Ginsberg, of the firm of Ginsberg and Hirsch, ladies' ready-to-wear, is seated in a night club, entertaining the buyer of a large San Francisco department store. He is getting along very well; so well, in fact, that there is but little doubt in his mind that he will receive an order. He urges the buyer to finish his drink and go with him to another club where the lights are even brighter, the entertainers even more en-



Pitcairn airline pilots.

(Left to right, top row)—Verne E. Treat, (3500 total flying hrs.); John S. Kytle, (2500 total flying hours.); R. Sidney Wodloy, (2500 hrs.); (bottom row)—Walter J. Shaffer, (2700 hrs.); Eugene R. Brown, (2500 hrs.); and Amberse M. Banks, (4000 hrs.).



Robertson airline pilots.

(Left to right, top row)—Walter Braznell (800 total flying hrs.); Ray Fortner, (3800 total flying hrs.); Julius Johannpeter, (1200 hrs.); (2nd row)—Eyer L. Sloniger, (6000 hrs.); Bert Ison, (6000 hrs.); (bottom row)—Harlan A. "Bud" Gurney, (3400 hrs.); R. D. Newton, (2000 hrs.); Kirby L. Whitsett, (400 hrs.).



Continental Air Lines pilots.

H. L. Kindred, (6250 total flying hrs.); Wm. M. McConnel, (4000 hrs.); Tilden "Pete" Johnson, (1900 hrs.); and Ross Arnold, (2700 hrs.).

tertaining. The buyer smiles and raises his glass. Lights and ladies—and liquor!

There are no ladies and no liquor on the rocky, timbered slopes of Nittany Mountain. And there is only one light—an air mail beacon. Even it is invisible now in the fog that has swept up from the south to enshroud the mountain. As the air mail pilot swings up from the valley near Milheim, a farmer, aroused from sleep by the plane flying so low, lies in his warm bed and wonders that anyone can be found to fly at night—and on such a night. For he remembers that when he turned in the night had been very foggy. Then, being very tired, he turns and stretches himself more comfortably in bed, and in a moment is asleep again.

On the air mail field at Bellefonte three mechanics are waiting for the New York mail. From the hangar outside of which they are standing, the landing lights are no more than misty glows. The men light cigarettes and move about, smoke those cigarettes, light fresh ones from the butts. One goes into the office, speaks into a telephone, comes out again. The others look at him inquiringly; he shakes his head. They stand listening and peering out through the fog. Waiting . . . Waiting. . . .

* * *

When Mr. Ginsberg awakened in his comfortable apartment on the Drive, the bright morning sun was painting the waters of the Hudson in silver and blue. Mr. Ginsberg, an artist himself in ladies' dresses, admired the sight and hastened to fit himself for business. He felt very cheerful at breakfast, and paused once to listen to the hum of many motors rolling down the Drive, carrying New York's millions, or part of them, to work. Another day, and business to be done—good business! Mr. Ginsberg smiled even more pleasantly, and spoke a cheerful word to his chauffeur before he sat back in his very comfortable limousine to peruse the morning paper. "NIGHT CLUB RAIDED," "ROBBERY IN BROOKLYN," "AIR MAIL PILOT MISSING,"—nothing of importance in the news. Mr. Ginsberg ruffled his paper impatiently and turned to news of the cloak and suit trade. His face brightened again, and he read interestedly.

In his office Mr. Ginsberg was brisk and cheerful. "Take a letter," he said to Miss Cohen. "Mandlebaum and Sons,



Western Air Express pilots.

(Left to right, top row)—George Young, (168 flying hrs. with W. A. E.); Kenneth Beer, (161 flying hrs. with W. A. E.); Royal Leonard, (425 hrs.); Fred Kelly, (2986 hrs.); L. W. Goss, (50 hrs.); Edward Eshleman, (550 hrs.); (bottom row)—Charles (Jimmie) James, (2674 hrs.); Jack Laas, (131 hrs.); Maurice Graham, (2918 hrs.); Peyton Gibson, (399 hrs.); and George Rice, (288 hrs.).



Pacific Air Transport pilots.

(Left to right, top row)—F. A. Donaldson, (3250 total flying hrs.); C. E. Johnson, (5250 total flying hrs.); Arthur D. Starbuck, (7500 hrs.); Ralph "Pee Wee" Virden, (4450 hrs.); Les Hubble, northwest divisional supt., Pacific Air Transport; E. L. Remelin, (4025 hrs.); (bottom row)—Harry G. Donaldson, (2450 hrs.); James R. Cunningham, (3650 hrs.); Al Gilhousen, (2300 hrs.); Charles R. Bowman, (3500 hrs.); Grover Tyler, (3000 hrs.); John C. Johnston, (2020 hrs.); and Heber C. Miller, (4435 hrs.).

San Francisco; Confirming receipt of your order—" Mr. Ginsberg dictated steadily for several minutes. "And Miss Cohen—" Mr. Ginsberg smiled, "I guess you better send it air mail."

* * *

That little story was written to make you think. How many of us are like Mr. Ginsberg? The great majority of us, I believe. We have reached a stage where we accept the really wonderful work of the air mail pilot as a commonplace of our modern life; we place a stamp on our letter, mail it, and forget it. Quite right, of course. We pay our nickel and we expect service. It would be odd for us to sit down and follow in imagination the course the air mail pilots follow as they carry our words through the night, over the treacherous country of hilly Pennsylvania, over the flat country of Ohio, land at smoky Chicago, go on across the plains and at last the Rockies, encountering rain and snow and sleet and fog and sometimes blizzards. And doing it alone.

No, we cannot think very often about the air mail pilot. Our own crowded lives exclude other than our own concerns. But for just a moment let us think of the man who is doing, every day and every night, the most consistently good work that ever has been done to advance aviation and make it a useful service to every one of us. For I believe that of late we have been forgetting him—the air mail pilot. He seldom gets into the papers—in fact, he has to die to get on the front page. Long distance flights, ocean flights, exploring flights are more exciting, more interesting, more spectacular. Naturally, inevitably, they capture the imagination of the public and win its praise; and I am not forgetting that most of this newly-awakened public interest in aviation is due solely to the amazing flights of these long-distance fliers.

But, after all, they have rendered no *service* to the public. Their work, valuable as it was, still was no more than advertising. It is the air mail pilot who, day after day, night after night, must supply the service that *all* of us can use. Even the new passenger-carrying lines, valuable additions to the country's transportation system though they are, can be used by only a very small fraction of the people. For years to come, no matter how fast we build planes, no more than a small percentage of the trav-



National Parks Airways pilots.

(Left to right)—Ray T. Elsmore, (1500 total flying hrs.); A. W. Stevenson, (4000 hrs.); J. M. Barns, (3300 hrs); Franklin S. Nelson, (1500 hrs.).



Varney Air Lines pilots.

(Left to right, top row)—Walter T. Varney, president Varney Air Lines; Paul Andert, (3600 total flying hrs.); Lionel Kay, (1540 total flying hrs.); (center row)—Harold E. Buckner, (1900 hrs.); Leon D. Cuddeback, vice president, (3000 hrs.); (bottom row)—Lt. Clarence C. Price, (3150 hrs.); George H. Buck, (2675 hrs.); Joe Taff, (3200 hrs.).



Northwest Airways pilots.
Homer Cole, John Malone, Walter Bullock, Fred Wittemore.

elling public can use them. But every one of America's hundred and twenty millions can buy a five-cent stamp and have his written word speeded across the continent.

Last night I stood on the Cleveland Airport, watching the night mail start for Chicago. The night was cold and windy, and rain had commenced to fall. I was reminded of a night in France—almost the same sort of a night—when I had sat in a bombing plane watching my fellow pilots taking off, one after the other, to carry death and destruction across the lines. Soon I would start, myself, on the same sorry mission, to kill or to be killed. The futile, wasteful, cruel savagery of the whole business, I recall, sickened me; and I wondered somewhat hopelessly if this wonderful invention, this aviation, ever would be used to serve mankind and not to kill them. And last night, as I watched that air mail pilot taking off for Chicago, and speeding the delivery of the nation's written word, it came to me that the vague hope that had stirred me that night eleven years ago had become at last a reality; the weapon of war had become the useful instrument of peace. And as I stood there in the rain, listening to the departing hum of the motor, I raised my hand to my hat in a farewell salute to that stout old air mail pilot. His, I thought, was a more noble mission.



Embry-Riddle airline pilots.
(Left to right, top row)—Warren R. Vine, (1600 total flying hrs.); Thomas Hill; Stanley C. Huffman, (3000 hrs.); (bottom row)—Frank C. Merrill, (2500 hrs.); John Paul Riddle, managing director.

Linking Rail and Air Transport

(Continued from page 1114)

at all Pennsylvania Railroad stations and ticket offices. The prospective passenger will expend no more energy in arranging his trip than that required to prepare for an all-rail journey.

As an initial step in the work of organizing the new rail-air route, the Pennsylvania Railroad sent two of its most experienced passenger traffic officers to Europe to make an intensive study of the airplane systems of the Continent and England. These were Charles H. Mathews, Jr., Assistant General Traffic Manager, Philadelphia, and Major C. E. McCullough, General Passenger Agent, Washington, D. C. These gentlemen have recently returned with a wealth of helpful information which is being carefully considered in connection with the rapidly developing plans for the new rail-air route. We have much to learn from Europe's comparatively long experience in the operation of passenger airlines. At the same time, I feel that when we get actively under way with air transport in America we shall be able to improve materially on many European practices.

Many auxiliaries and feeders are being planned for our main transcontinental rail-air route. The first of these was established on September 1 between Chicago and the Twin Cities, Minneapolis and St. Paul. It is now in successful daily operation between these cities, connecting on regular schedules with transcontinental trains both east and westbound. This service is being operated by Northwest Airways, Inc., which is associated in interest with Transcontinental Air Transport, Inc., and the Pennsylvania Railroad.

The new rail-air route to the Northwest saves an entire business day on through trips between eastern cities and points west of Minneapolis and St. Paul. Approximately 8 hours are cut from the time now required to make a train journey between Chicago and the Twin Cities. The westbound plane flies from Chicago to St. Paul in exactly four hours and to Minneapolis in 4 hours and 10 minutes. Eastbound, the time is 3 hours and 40 minutes from Minneapolis to Chicago and 3 hours and 30 minutes from St. Paul to Chicago.

As time goes on it is our purpose to develop many other auxiliary and feeder lines similar to the Northwest Airways, supplementing or coördinated with the main transcontinental route between New York and the Pacific Coast.

I sincerely feel that, as our rail-air lines are established in regular and dependable operation, and as the public comes to have implicit faith in the efficiency of the service, realizing to the fullest extent the tremendous possibilities in time saving offered by the airplane, these lines not only will be well patronized but will justify their existence on a sound commercial and economic basis.

For this reason, as I said before, we are not attempting anything visionary or experimental but only that which we feel can be sold to the public regularly and dependably and in full faith and confidence. I have no illusions about the commercial limits of airplane transportation. For a long time to come, airplanes will serve, I believe, in an exclusive field of their own, providing exceptionally fast transportation at a necessarily higher rate than that charged by the railroads and other forms of transport, and appealing to those whose needs or tastes are beyond the usual.

I do not feel that the airplane will measurably compete with the train, the steamship or the automobile, but that it simply will stimulate a demand for a new form of transport and will very efficiently meet that demand.

THE YOUNG MAN OF EUROPE

By
James Warner Bellah
Special Foreign Correspondent to Aero Digest

IT seems to me, in looking back over the events of the last decade, that what the world needs is a few lessons in How to Make Peace. Someone might start a correspondence school on the subject.

"Ten Years Ago I could Make
No Peace—But After
Your Easy Lessons—"

I could provide the man who does with a bushel of testimonials. I could get him some excellent ones from the Air Ministry in London, for instance—and some more from Signor Mussolini whom God preserve! Then I could take him to the little French garrison town in which I live at periodic intervals and let him copy one hot off the walls of the barrack square:

"Frenchmen awake!

The Germans hate your blood and race!"

underscored by a list of some twenty-five engagements and the total casualties of the five replacement regiments of the 24th Alpine Chasseurs who died from the Marne to the Vaux Forts and back again, for some reason, never quite clear, and now forgotten.

This sounds like 1917 ballyhoo but it is not, let me assure you. What Germany or Europe does to itself from now until the end of time will never interest me again—except as a bystander, and except as it threatens America with war on our own soil.

We've had quite enough of poking our noses into other people's fights, and if anyone cares to argue the point with me, I will talk to him for fifty-two hours non-stop and prove it—but not here.

Here, I speak of Germany, and lest anyone still thinks I speak with malice, hate or any other recruiting emotion, I will say that I spent last Armistice Day in a British Crown Colony with three ex-German officers, ate with them, walked the streets with them and bought them Flanders poppies to keep the peace. Bastile Day I spent with a Japanese in Paris, and Washington's Birthday I dined in a London Club and ate fish with a knife and fork. I'm immune, my passport is visaed properly, and my eyesight in three more years will be so rotten the staff won't have me.

Let us get the situation well in hand. Some few years ago a paper was drawn up, sealed and signed, and placed on record as the Locarno Treaty.

One of the stipulations forbade Germany to have any military air force whatsoever. Germany didn't and hasn't; consequently she leads the world today in flying—leads it quietly and completely in the only phase thereof worth considering, with a thoroughness that only Germany is capable of.

And the only phase of flying worth considering is national air-mindedness. Time flown follows that, as day follows night. Equipment follows it, as night follows day. Air-mindedness is the secret, and the late Allies forced air-mindedness on Germany and have been kicking themselves ever since.

Figures for the slip-stick lads are here:

	Miles flown per annum
Germany	6¾ millions
United States	5 millions
France	3½ millions
England	1 million

Germany (with no military air force) flies 40,000 miles a day in the summer time, and her airliners carry 20,000 passengers a month. In July, latest specific figures, she flew 123 tons of freight, 163 tons of personal luggage and 102 tons of postal matter.

With a grip of this kind and the impetus of commercial gain and the instinct of self preservation behind her, is it any wonder that she is slowly throttling other European flying and spreading her air tentacles out in all directions and over all territories?

Follow me. She has long had the Russian situation in hand—anyone could get that in a J.N.4., powered with an air-cooled sail and a pair of supercharged oars, if he happened to be on the lot as Germany was. The Russian situation was Germany's logical meat. But see what it has led to. In Pekin last year I heard rumors

(*Continued on page 1302*)



Interior view of Junkers G 31



Typical German airliners—the Junkers type G 31 and the Dornier Superwal

AERO DIGEST

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ORVILLE WRIGHT

A GREATER benefactor than any king or president, an accomplisher of more than any millionaire, fit to be ranked with Galileo and Watt, Stephenson, Whitney, Fulton, Edison and Ford, a good, grey and notably silent gentleman will be fifty-eight years old next August and so, upon that magic date in this December, the twenty-fifth anniversary of human flight, will be still well under his three score.

Any of the tens of thousands of celebrants doing any of the exercises which will occur in many portions of the world on that occasion, who may think that they are doing honor to the airplane as they celebrate, will be mistaken. They will be doing honor to the good, grey and notably silent gentleman. For the airplane is but the figment of his brain. The anniversary is not that of the machine. The quarter-centenary of heavier-than-air flight is really Orville Wright's.

That is something which the growing thousands of this nation's aviators, the many who are finding useful posts and splendid profits in the aeronautical industry and its ramifications must not be permitted to forget. The quarter-centenary of heavier-than-air flight is really not just that; it is the quarter-centenary of a thought born in the brains of two silent, pensive, inseparable young brothers —that thought made manifest. The first airplane had its first flight not at Kitty Hawk but in the minds of Wilbur Wright and Orville—one of whom remains to us.

What can the world do? What can the nation do? What can all the flying men and women of today do, what can we of the industry do on December 17th, to show our honor for and appreciation of that slim and modest, notably silent man out in Ohio?

Whatever we may do will be too little. An adequate recognition of the services of Orville Wright is as impossible as an adequate recognition of the services of Thomas A. Edison would be.

THE CONFERENCE

THE International Conference called by President Coolidge for December, in Washington, will offer an opportunity for some mighty fine work in the interests of aviation. Delegates will attend from all the flying countries.

The planned program will assure an instructive interchange of real ideas by the experts from those "flying countries"; and bear in mind the thought that such discussions among experts may do much toward creating an international atmosphere of brotherly love—that effective sort of brotherly love which is based on admiration and respect.

Respectful coöperation among the world's air-minded may very well be more valuable as a preservative of peace than any treaty, or any naval pact—or unpact.

AERO DIGEST has repeatedly declared its firm belief that air development will bring war to an end. The quickest, cheapest form of transferring human beings from one country to another will result in better understandings, and the same ability concerning bombs will result in international respect. Men will fight till fighting ceases utterly to pay. It will cease to pay the moment we all understand that an air-borne bomb from little Belgium conceivably might do far greater damage than one from the most powerful nation in the world. That will be a part of the education which the airplane and its development will broadcast. The conference may help to circulate the thought.

What we strive imperfectly to say is merely that this air conference, and others which will follow it, may so very fully terrify the dogs of war as to send them yelping home with their tails between their legs.

The airplane is a dove of peace—which may develop rending talons and an eagle's murderous beak. Such grim accessories are easily attached to erstwhile peaceful aircraft. And what a noisy bird the dove of peace becomes when so outfitted. Its erstwhile gentle cooing has become the roar of a propeller. Yea, verily, the airplane will bring peace unto the world. If it cannot wake 'em up and manage it by friendly missions the first time, it can do the opposite—once only. It never will need repetition. The one doing will have been too horrible.

So here's to that Air Conference! May it talk much and intelligently. And may the words of wisdom spoken sink deep into the world's political and financial minds!

TUCKER AND COLLYER

IT will be a long time before the United States will produce another man more utterly enthusiastic about aviation than the late Harry J. Tucker, who, with Captain C. B. D. Collyer, was killed November 5 when his famous monoplane, *Yankee Doodle,* struck against a wall of Crook Canyon, Arizona, during a blinding rain and fog. Collyer, his pilot, also had become internationally famous.

Harry Tucker had made money in the oil and automobile businesses in California and, after he took up aviation as a sport, quickly became widely known because of the sheer determination of his enthusiasm. He was a genial but quiet chap—one of those who do a lot of thinking and not such a lot of talking. In his plane, the *Yankee Doodle,* with Collyer as pilot, he made a record east-to-west transcontinental flight, non-stop (24 hours and 51 minutes), only a few weeks before the fatal crash.

Collyer was partner to J. H. Mears on the record-breaking twenty-three day circuit of the world made last July in a Fairchild cabin monoplane. He had been an air mail pilot and a test pilot.

Aviation loses through the passing of these men.

THE SPIRITUAL SIDE

AERO DIGEST sends the season's greetings to all whom it counts its friends and they include not only those directly interested in the art and business of aviation but that whole cream of America's intelligent people which sees in human flight by mechanical process such a progression as inevitably must revolutionize the world upward. Man's desire to fly was from its beginning more a spiritual than a practical yearning and it is our Christmas hope, this wonderful year, that this may, and our belief that it will beneficently influence the course of all our aëronautical activities.

AERO DIGEST wishes you

A MERRY CHRISTMAS
and
A HAPPY NEW YEAR



The Chicago Coliseum © Kauffman & Faby.

THE INTERNATIONAL AERONAUTICAL EXPOSITION

At the Coliseum and First Regiment Armory, Chicago—December 1-9, 1928

THE nine days during which the International Aeronautical Exposition of the Aeronautical Chamber of Commerce will be open to the public in the Coliseum and the First Regiment Armory in Chicago, will be marked by a series of meetings of considerable importance to the industry.

On Sunday, December 2nd, the first day of the Show, the Flying School Committee of the Chamber, consisting of C. S. Jones, of the Curtiss Flying Service, Garden City, Long Island, New York; Tex Rankin, Rankin Flying Service of Portland, Oregon, and Oliver Parks of the Parks School of Aviation, St. Louis, Missouri, will meet at the Stevens Hotel for the preparation of a report on flying schools. This report will serve as a standard to which operators of flying schools must qualify before they become eligible to the membership of the Aeronautical Chamber of Commerce. Mr. Jones' committee was appointed as the result of conference between the Commercial Airplane Manufacturers' Section of the Chamber and officials of the Aeronautics Branch, Department of Commerce, Washington, D. C.

On the evening of this day, the Chamber will have as its guests, at an informal dinner at the Stevens Hotel, the working trade paper and newspaper correspondents assigned to the Chicago Exposition.

At eight o'clock Monday morning, December 3rd, publishers of trade papers belonging to the Chamber will meet at breakfast to organize the Publishers' Section.

From 3 to 5 p. m. Monday, a general meeting of the members of the Chamber will be held at the Stevens. One of the principal reasons for this meeting is to enable the members to discuss their desires as to proposed air show applications, sanctions for which have been received by the Chamber from many parts of the country.

The entire day, Tuesday, December 4th, will be devoted to meetings of the Commercial Airplane Manufacturers' Section of the Chamber. All sessions will be held in the Stevens Hotel. Representatives of the Department of Commerce are invited to attend. Subjects of regulation and sales development occupy a prominent place on the agenda.

All of Wednesday and Thursday, December 5th and 6th, will be devoted to joint meetings on aeronautical engineering to be held under the auspices of the Aeronautical Chamber of Commerce and the Society of Automotive Engineers, morning sessions starting at 9:30; afternoon sessions at 2. At 2 p. m. on Thursday, a special meeting will be held by the Society of Automotive Engineers and the Commercial Airplane Manufacturers' Section of the Chamber. At 4 p. m. this meeting will be thrown open to all members of the Chamber who desire to attend.

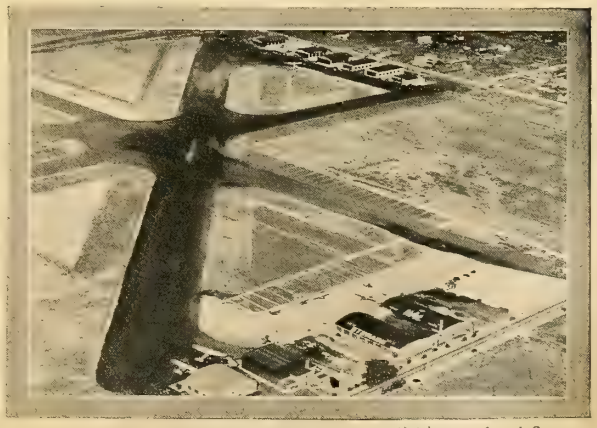
All of Friday, December 7th, is to be devoted to a National Airport Conference which the Airport and Airway Section of the Chamber has called, starting at 10:00 a. m. at the Stevens Hotel. Major John Berry, chairman of the Chamber's Airport Section and Mr. A. L. Johnson, president of the National Airport Executives Association, which was formed during the Air Races of Los Angeles, have cooperated in inviting all persons interested to attend this Conference. Mr. Howard C. Knotts, secretary and treasurer of the National Airports Association, who is a member of the Airport Committee and of the Chamber, has also extended coöperation.

Friday, December 7th, will also mark the arrival, in the afternoon, of between 150 and 200 delegates from approximately 50 foreign nations, who will attend the International Civil Aeronautics Conference in Washington, as an auxiliary feature of which the Chicago Show was designed. These delegates will visit the Show late Friday afternoon, as the guests of the Chamber, and on Friday evening, will be entertained in Chicago at a public banquet.

From reports received by the Chamber, it is indicated that several thousand people will fly into Chicago for the



Chicago's skyline.



© Chicago Aerial Survey.

Chicago Municipal Airport.

Show and the attendant meetings. In addition to this, many thousands more will utilize rail transportation. Special rates have been established by all of the railroads and special trains are being run by the Pennsylvania Railroad.

Complete hangar, mechanical, oil and gasoline services will be available at the Chicago Municipal Airport to all aircraft manufacturers who fly their ships to Chicago during the exposition.

Two hangars will be used for storage, Gray Goose Air Lines and Universal Air Lines.

The Stevens Hotel, Chicago's largest hostelry, has been designated as the official hotel for the exposition. Located at Michigan Boulevard and Ninth Street, the hotel is within eight blocks of the Coliseum and the First Regiment Armory where the Exposition will be held.

The Aeronautical Chamber of Commerce has detailed Lieutenant Jack Harding and John Proctor from its New York staff to supervise the plans at the exposition. A. B. Coffman is business manager; Major Reed Landis is handling advertising, and W. B. Williams, publicity.

EXHIBITORS AT THE CHICAGO AIRCRAFT SHOW

AIRCRAFT EXHIBITORS

Firm	*Individual*	*Address*
Advance Aircraft Co.	R. E. Lees	Troy, Ohio
Aerial Service Corp.	J. E. Meade	Hammondsport, N. Y.
Aeromarine Klemm Corp.	W. H. Douglas	Keyport, N. J.
Aire-Kraft, Inc.	C. W. Brown	Washington, Pa.
Airworthy Airplane Co.	F. H. Jolly	Chicago, Ill.
Alexander Aircraft Co.	J. D. Alexander	Colorado Springs, Colo.
All-American Aircraft Corp.	Carl Wollan	Akron, O.
Columbia Air Lines, Inc.		Long Island City, N. Y.
Alliance Aircraft Corp.	Lyman Reid	Alliance, O.
American Eagle Aircraft Corp.	D. H. Hallowell	Kansas City, Mo.
Boeing Airplane Co.	Eric H. Nelson	Seattle, Wash.
Buhl Aircraft Co.	L. G. Meister	Marysville, Mich.
Butler Mfg. Co.	W. A. Knapp	Kansas City, Mo.
Capital Aircraft Corp.	D. D. Thomas	Lansing, Mich.
Cessna Aircraft Co.	M. Hargiss	Wichita, Kansas
Command-Aire, Inc.	R. B. Snowden	Little Rock, Ark.
Consolidated Aircraft Corp.	L. Wade	Buffalo, N. Y.
Curtiss Aeroplane & Motor Co.		Garden City, N. Y.
Driggs Aircraft Corp.	Ivan H. Driggs	Lansing, Mich.
Fairchild Aviation Corp.	H. B. Grosvenor	Farmingdale, N. Y.
Fokker Aircraft Corp. of Amer.		Hasbrouck Hghts, N.J.
Ford Motor Co.		Dearborn, Mich.
Gates-Day Aircraft Corp.	I. R. Gates	Paterson, N. J.
General Airplanes Corp.	G. MacL. Gardner	Buffalo, N. Y.
Hall Aluminum Aircraft Corp.	C. W. Hall	Buffalo, N. Y.
Hamilton Metalplane Co.	Thos. F. Hamilton	Milwaukee, Wis.
Heath Airplane Co.	E. B. Heath	Chicago, Ill.
Keystone Aircraft Corp.	Ed. M. Gott	Bristol, Pa.
Kreider-Reisner Aircraft Co.	A. H. Kreider	Hagerstown, Md.
Joseph Kreutzer Corp.		Los Angeles, Calif.
E. M. Laird Airplane Co.		Chicago, Ill.
Mahoney-Ryan Aircraft Corp.	John C. Nulsen	Anglum, Mo.
Mohawk Aircraft Corp.	S. E. Whitney	Minneapolis, Minn.
Monarch Aircraft Co.	Arthur W. Rosa	Riverside, Ill.
Mono-Aircraft, Inc.	G. E. Stange	Moline, Ill.
Moth Aircraft Corp.		New York, N. Y.
National Air Transport, Inc.	L. W. Seymour	Chicago, Ill.
Phantom Knight Aircraft Co.	W. M. Manley	Oak Park, Ill.
Pitcairn Aircraft, Inc.	H. F. Pitcairn	Philadelphia, Pa.
R. A. Rearwin		Salina, Kan.
Simplex Aircraft Corp.	G. H. Roberts	Defiance, O.
Spartan Aircraft Co.		Tulsa, Okla.
Star Aircraft Co.		Bartlesville, Okla.
Stearman Aircraft Co.	J. E. Schaefer	Wichita, Kan.
Stinson Aircraft Corp.	W. A. Mara	Northville, Mich.
Stinson School of Aviation	J. L. Loftus	Detroit, Mich.
Swallow Airplane Co.	V. Roos	Wichita, Kan.
Szekely Aircraft Corp.	O. E. Szekely	Holland, Mich.
Travel Air Mfg. Co., Inc.		Wichita, Kan.
Chance Vought Corp.	G. W. Vought	Long Island City, N.Y.
Waldron Aircraft & Mfg. Co.		Minneapolis, Minn.

ENGINE EXHIBITORS

Firm	*Individual*	*Address*
Aeronautical Products Corp.	H. A. Johnson	Naugatuck, Conn.
Axelson Machine Co.	J. C. Axelson	Los Angeles, Cal.
E. W. Bliss Co.	J. B. McCann	Brooklyn, N. Y.
Brownback Motor Lab., Inc.	R. G. Lyon	New York, N. Y.
Campbell Peterson & Co.		New York, N. Y.
Curtiss Aeroplane & Motor Co.		Garden City, N. Y.
K. G. Frank	H. Sampter	New York, N. Y.
Kinner Airplane & Motor Corp.		Glendale, Cal.
Michigan Screw Company	H. B. Lundberg	Lansing, Mich.
Pratt & Whitney Aircraft Co.	F. B. Rentschler	Hartford, Conn.
Spartan Aircraft Co.		Tulsa, Okla.
Szekely Aircraft Corp.	O. E. Szekely	Holland, Mich.
Velie Motors Corp.	Willard Velie	Moline, Ill.
Warner Aircraft Corp.	Ed. N. Hartwick	Detroit, Mich.
Wright Aeronautical Corp.	J. T. Hartson	Paterson, N. J.

OTHER EXHIBITORS

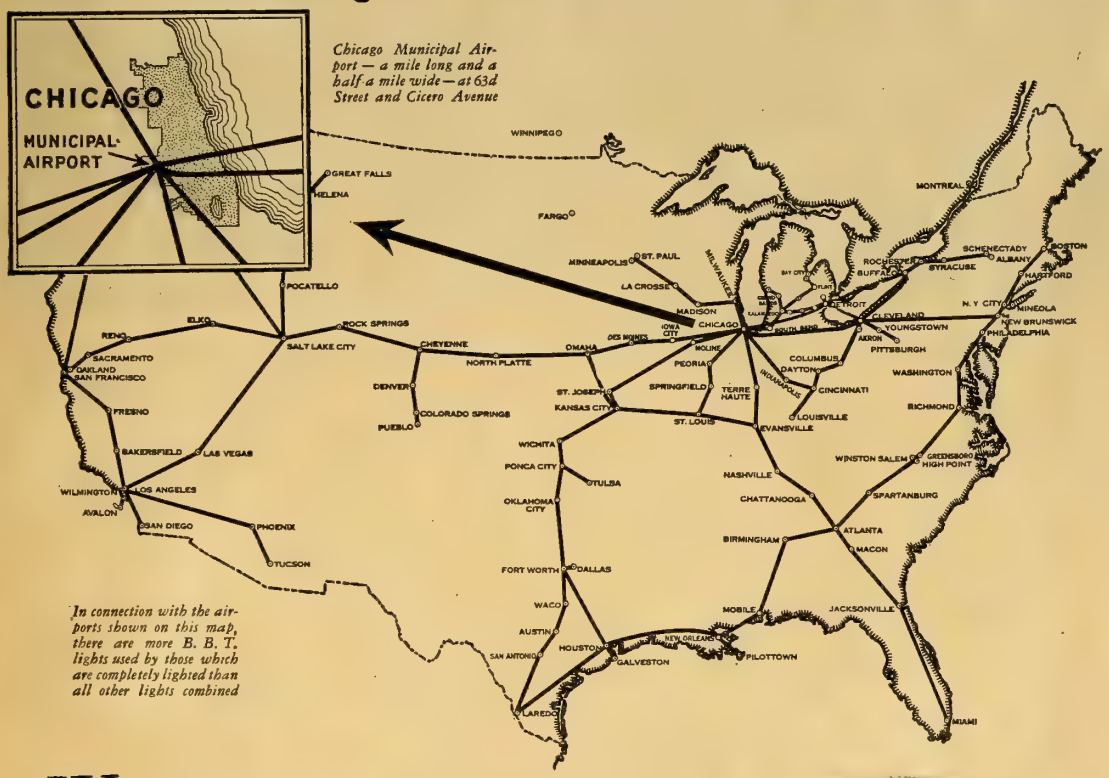
Firm	*Individual*	*Address*
AERO DIGEST	G. F. McLaughlin	New York, N. Y.
Aeronautical World	E. M. Kimberlin	Los Angeles, Cal.
A. C. Spark Plug Co.	E. McGinnis	Flint, Mich.
Aero Guides	J. B. Roth	New York, N. Y.
Aero Model Co.		Chicago, Ill.
Aero Supply Mfg. Co., Inc.	J. I. Stitch	College Pt., N. Y.
Aerovane Utilities Corp.	D. A. Griffith	New York, N. Y.
Airports	H. Schwarzschild	Flushing, N. Y.
Air Transportation	L. Nixon	New York, N. Y.
Airway Age	R. F. Duysters	New York, N. Y.
Aluminum Co. of America		Pittsburgh, Pa.
American Airports Corp.	M. Dodge	New York, N. Y.
American Aviator	C. H. Farrell	New York, N. Y.
American Rolling Mills	P. H. Cumphrey	Middletown, O.
Arens Patent Control	C. A. Arens	Chicago, Ill.
Armco Culvert Mfrs. Ass'n	A. S. Rosing	Middletown, O.
Atkinson Aviation Co.	F. H. Atkinson	Gary, Ind.
The Austin Co.	W. E. Arthur	Cleveland, O.
Aviation	Geo. Newbold	New York, N. Y.
Balsa Wood Company, Inc.	S. H. Figg	New York, N. Y.
B. B. T. Corporation		Philadelphia, Pa.
Bendix Brake Co.	H. L. Sharlock	South Bend, Ind.
Berry Bros., Inc.	O. L. Forgey	Detroit, Mich.
Blinke Spray Equipment Co.		Chicago, Ill.
Black & Decker Mfg. Co.	R. W. Procter	Towson, Md.
Sidney Blumenthal & Co.	G. B. Matthews	New York, N. Y.
Bohn Aluminum & Brass Corp.	C. W. Eggonweiler	Detroit, Mich.
Robt. Bosch Magneto Co.		Long Island City, N. Y.
Canvas-Leather Specialty Co.	W. A. Schlegel	Trenton, N. J.
Celotex Company		Chicago, Ill.
Chicago Aero. Service, Inc.	T. Walliser	Chicago, Ill.
Chilton Class Journal Co.		Philadelphia, Pa.
Cleveland Pneumatic Tool Co.		Cleveland, O.
Consolidated Instrument Co.		New York, N. Y.
Crouse-Hinds Co.	F. J. Fancher	Syracuse, N. Y.
Department of Commerce	Col. H. H. Blee	
	Wm. F. Scentlar	
DeWalt Products	L. McDonald	Leola, Pa.
Eclipse Machine Co.	A. E. Raabe	East Orange, N. J.
Elgin National Watch Co.	G. C. Gillies	Chicago, Ill.
Electric Storage Battery Co.	A. B. Freitzburg	Philadelphia, Pa.
Endicott Forging & Mfg. Co.		Endicott, N. Y.
Ex-Cell-O Tool & Mfg. Co.	F. D. Sicklsteel	Detroit, Mich.
Fairchild Aerial Camera Corp.	S. M. Fairchild	New York, N. Y.
Firestone Tire & Rubber Co.	S. R. Brink	Akron, O.
Follmer, Clogg & Co.	J. A. Maxwell	Lancaster, Pa.
Wm. H. Gardner & Sons	W. H. Gardner, Jr.	Forest Pk., Ill.
General Electric Co.	H. C. Ritchie	Schenectady, N. Y.
Globe-Superior Corp.	L. G. LeMatty	Abingdon, Ill.
B. F. Goodrich Rubber Co.	T. A. Aspell	Akron, O.
Goodyear Tire & Rubber Co.	W. C. Young	Akron, O.
Gordon & Ferguson, Inc.		St. Paul, Minn.
Greer College	E. Greer	Chicago, Ill.
Guaranteed Aircraft Hangar Co.		Richmond Hill, N. Y.
Hall Aluminum Co.	C. W. Hall	Buffalo, N. Y.
Hamilton Aero Mfg. Co.		Milwaukee, Wis.
Stewart Hartshorn Company		New York, N. Y.
Haskelite Mfg. Corp.	J. R. Fitzpatrick	Chicago, Ill.
Heywood Starter Corp.	F. B. Stener	Detroit, Mich.
John C. Hoof & Co.	J. C. Hoof	Chicago, Ill.
Inter'al Derrick & Equip. Co.		Columbus, O.
Irving Air Chute Co., Inc.	Geo. Waite	Buffalo, N. Y.
Johnson Airplane & Supply Co.	E. A. Johnson	Dayton, O.
The Kawneer Co.		Niles, Mich.
Kendall Refining Co.	I. H. Shearer	Bradford, Pa.
Joseph Kreutzer Corp.	A. J. Edwards	Los Angeles, Cal.
Leece-Neville Co.	G. S. Cole	Cleveland, O.
Linde Air Products Co.		New York, N. Y.
The Macwhyte Company	J. S. Whyte	Kenosha, Wis.
E. B. Meyrowitz, Inc.		New York, N. Y.
Morgan Co.		Peoria, Ill.
Motometer Co., Inc.	A. T. Elverson	Long Island City, N.Y.
National Steel Products Co.	Jos. G. Lehman	Dayton, O.
New Departure Mfg. Co.	C. F. Olin	Bristol, Conn.
New York Rubber Co.	W. C. Rogers	New York, N. Y.
Norma-Hoffman Brgs. Corp.		Stamford, Conn.
Marvin A. Northrop		Minneapolis, Minn.
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Pan-American Airways, Inc.	J. M. Maton	New York, N. Y.
Paragon-Engineers, Inc.	S. Heath	Baltimore, Md.
Parker Appliance Co.	A. L. Parker	Cleveland, O.
Pennsylvania Railroad	H. T. Weekin	Philadelphia, Pa.
Phister Mfg. Co.	H. T. Roseland	Cincinnati, O.
Pioneer Instrument Co.	C. H. Colvin	Brooklyn, N. Y.
Plycor Co.	M. Vimes	Chicago, Ill.
Popular Aviation	H. W. Mitchell	New York, N. Y.
J. V. G. Posey & Co.		Portland, Ore.
Post Office Department	B. F. Myers	
Psychology Publishing Co.		New York, N. Y.
Purex Company	M. H. Turner	Chicago, Ill.
Pyle National Company	J. A. Amos	Chicago, Ill.
Pyrene Mfg. Co.	G. F. Smith	Newark, N. J.
Quaker State Oil Ref. Co.	C. D. Berry	Oil City, Pa.
Rand McNally & Co.	G. Henert	Chicago, Ill.
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SKF Industries, Inc.	R. G. Byler	New York, N. Y.
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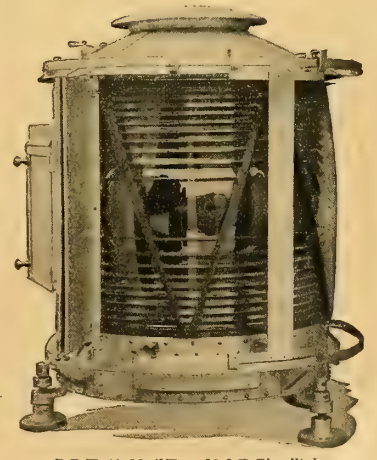
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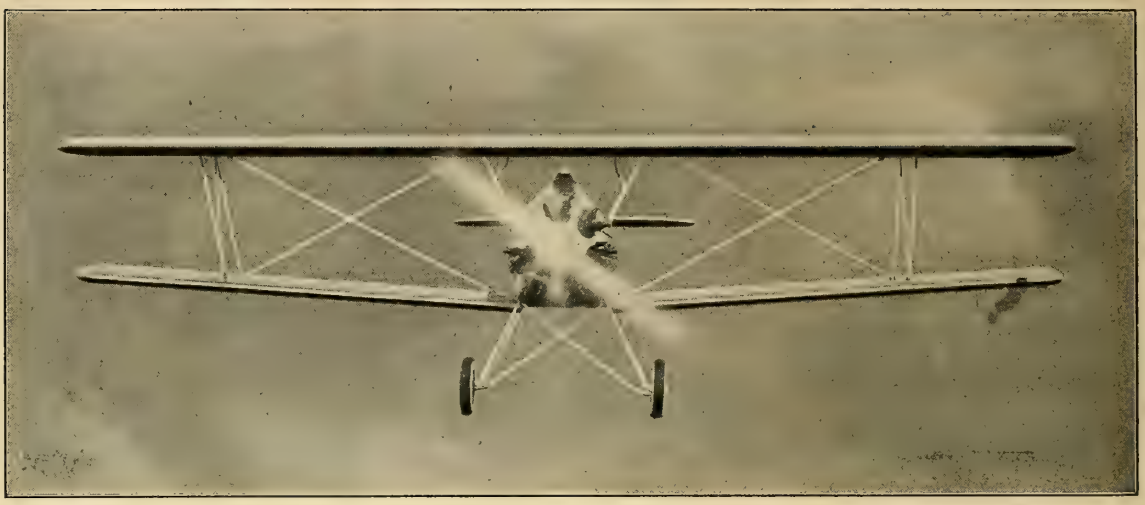


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RESEARCH AND THE AIRPLANE

By William H. Miller
(Part 1)

THE conquest of the air has engaged the efforts of mankind for ages. Legends of Ancient Greece tell of attempts to emulate the flight of birds, and it is written, also, that during the reign of Nero a certain Roman named Simon was carried through the air in a "chariot of fire." In the year 1505 Leonardo da Vinci published his famous "Codex on the Flight of Birds", having been inspired probably by the purported flights of his compatriot Danti in an apparatus similar to the modern glider. At Versailles, France, on September 19, 1783, the hot-air balloon of the Montgolfier Brothers made its historic ascent with the world's first aerial passengers, namely, "a sheep, a cock, and a duck." The flight of Pilatre de Rozier and the Marquis d'Arlandes in a similar craft followed a few weeks later. After subsequent improvements in the spherical balloon by the great French physicist, Charles, ascensions became one of the most popular forms of sport—particularly among the nobility—prior to the French Revolution.



The ascent of de Rozier and d'Arlandes in the first man-carrying balloon.

Probably the first one to make substantial contributions to the science of dynamic flight was Sir George Cayley, who, in 1809 and 1810, described his various experiments with small models in *Nicholson's Journal,* the *Philosophical Magazine,* and other scientific periodicals of his day. Cayley died in 1857. There followed many others who contributed materially to theory and performed experiments having a direct bearing upon the fundamental principles involved, until at last, in 1868, John Stringfellow built what appears to have been the first flying model. It is said that his machine, with a small steam engine and screw propeller, flew about 120 feet. In 1871 and 1872 successful models of airplanes, helicopters, and ornithopters were built and flown by the Frenchman, M. Penaud. It is probable, in fact, that Penaud should be given credit not only for the first really successful flying models—which, incidentally, were propelled by means of airscrews driven by rubber bands—but also for the immediately marked advance in the art during the latter part of the nineteenth century.

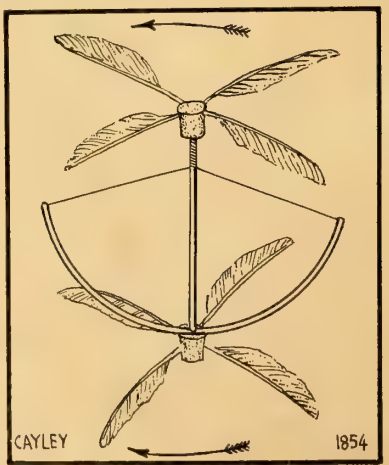
Probably no scientist of modern times, prior to the successful flights of the Wright brothers, contributed as much toward experimental aerodynamics as Dr. Samuel Pierpont Langley of the Smithsonian Institution in Washington. There, and at the Allegheny Observatory, Dr. Langley had conducted tedious experiments of a fundamental character on the resistance of the air to moving objects, and its reaction on inclined surfaces, by means of a "whirling arm." The published results of his work, entitled "Experiments in Aerodynamics", appeared in 1891 and attracted much attention among the world's leading scientists. Dr. Langley began the construction of his celebrated steam-driven, tandem-wing flying models—called "aerodromes"—after he had obtained enough experimental data to serve as a basis for design computations.

The flight of his Aerodrome No. 5 over the Potomac River, on May 6, 1896, marked the first really *practical* demonstration in this country of a miniature heavier-than-air machine sustained in free flight by means of its own power plant. The machine, which weighed 26 pounds and had 74 square feet of wing area, executed a continuous flight of about 3,000 feet, settling gently on the water after exhausting its fuel. Subsequently, the same machine made two more successful flights.

Prof. Langley was urged to extend his experimental work to full scale, and in 1898 he began the construction of a man-carrying aerodrome. In this undertaking, which was financed by the War Department, he had the able assistance of the late Charles M. Manly, who designed and constructed a radial type gasoline engine for the machine. This was the first installation of an internal combustion engine in an airplane. The engine, which was quite successful, remains to this day a marvel of mechanical ingenuity.

During attempts to launch the full size aerodrome over the Potomac in December, 1903, the catapult failed and the machine was badly damaged. Because of the lack of further financial assistance, and perhaps more because of ill health induced by worry and humiliation over the apparent failure of his man-carrying aerodrome, Dr. Langley discontinued his experiments, and died in 1906, three years after the first flight of the Wright power-driven aeroplane. Today, the great Langley Memorial Aeronautical Laboratory at Hampton, Virginia, stands as a monument to one whose pioneer research stimulated the marvelous progress of aeronautical science during the past twenty years.

One hundred and twenty years passed from the time of the first ascension of a lighter-than-air craft—the Montgolfiers' balloon—until Orville Wright made the initial flight of man in a power-driven heavier-than-air machine. In the meantime, of course, (as we have already shown) much experimenting had been done not only by the Wrights, but by pioneer inventors and scientists in the various countries. Otto Lilienthal in Germany (in 1896) and Percy Sinclair Pilcher in England (in 1899) had given their lives in the development of the glider, or motorless airplane. In this country the Wrights were inspired by the pioneering of Octave Chanute, the distinguished civil engineer who later assisted them materially in their own gliding experiments.



Sir George Cayley's flying model.

The Wright Brothers were the first

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to appreciate the importance of control, and the flights of their 1900-02 gliders convinced them that their system of lateral, directional, and longitudinal control was satisfactory. Furthermore, they were certain that they had accumulated a sufficient amount of reliable data to make design calculations with a degree of accuracy hitherto unapproached by any one of their predecessors. They had inaugurated experimental methods which were destined to be adopted universally, their data having been obtained from measurements of the lift, resistance, and "centre of pressure" on inclined model wing surfaces exposed to a current of air.



The Lilienthal glider of 1896 demonstrated in flight.

Since they had tried in vain to purchase a suitable gasoline motor for their power-driven machine, they ceased any further aerodynamic experiments and concentrated their attention upon the development of a light, water-cooled, internal combustion engine. Within six weeks from the time the design was started, the Wrights and their assistant, Mr. C. E. Taylor, were testing the engine in their Dayton shops. In its finally developed form the motor gave 12 horsepower, and with this amount of power the Wrights calculated that the gross weight of their biplane could be as high as 800 pounds.

The original Wright biplane, built in Dayton, Ohio, and flown successfully at Kitty Hawk, North Carolina, on December 17, 1903, was launched from a mono-rail by means of a cable running from the machine, over pulleys, to a droppable weight. Directional control of the machine was obtained by means of a rudder mounted on "outriggers" behind the wings, longitudinal control by a horizontal "elevator" in front of the wings, and lateral control by warping the wings. Although Orville Wright's first flight from Kill Devil Hill lasted but twelve seconds, it was, nevertheless, the first time in history that a dynamic flying machine carrying a man had arisen under its own power, sailed forward at a steady speed, then landed at a point as high as that from which it had risen.

Too much emphasis can not be placed upon the fact that, immediately after the historic flights of Orville and Wilbur Wright at Kitty Hawk, many of the foremost scientists of America and Europe became interested in aeronautics; and, particularly after 1906, experimental research went forward at a rapid pace. Among those in America who at an early date became identified with the development of the airplane was Dr. Alexander Graham Bell, inventor of the telephone. Dr. Bell had witnessed the successful flight of Langley's No. 5 Aerodrome model and had manifested an interest in aeronautics even before the year 1900.

In October, 1907, he formed the Aerial Experiment Association consisting, besides himself, of Glenn H. Curtiss, Lt. Thomas Selfridge, F. W. Baldwin, and J. A. D. McCurdy. Experiments involving a wide range of projects, including kites, air-propelled boats, and airplanes, were carried out at Hammondsport, New York, and Beinn Bhreagh, Nova Scotia, during the Fall and Winter of 1907-08, under the direction of Mr. Curtiss. It is pertinent to remark here that Mr. Curtiss had been a manufacturer of motor-cycles and engines for dirigible balloons since 1904, and largely because of his knowledge of aeronautical motors, he was made director of experiments for the association.

The Aerial Experiment Association built four machines with material success. The third one, called the "June Bug", made the first previously announced public flight in America on July 4, 1908, piloted by Mr. Curtiss.

During this inventive period notable developments in the airplane were made. The Aerial Experiment Association had devoted particular attention to the improvement of lateral control with the result that in the winter of 1908-09 the so-called "lateral balancing surfaces" were designed and tried out successfully by Mr. Curtiss. The use of a movable horizontal plane on each side of the longitudinal axis between the upper and lower surfaces of a biplane not only eliminated the structural difficulties involved in the warping of the wings to give lateral control, as in the Wright machine, but also practically eliminated the very serious yawing effect of the warped wing which necessitated simultaneous use of the rudder in order to prevent the machine from turning about its vertical axis. Furthermore, in both this country and Europe, machines began to appear with the elevator (for maintaining fore and aft equilibrium and control) attached to outriggers behind the wings, which arrangement was found to increase greatly the inherent stability of the machine.

One of the most important basic improvements in the airplane made during this era was the employment of a hinged flap set into each wing, thus forming a movable trailing edge in the vicinity of the wing tip. This form of lateral control—which is standard today—appears to have been devised by William W. Christmas in this country, and independently, by the Farman brothers in France. These movable wing flaps for lateral control first came into vogue in Europe, and were called "ailerons." Later they were universally adopted.

The first flight of a hydroairplane from the water which was consummated by a safe landing on the same medium was made by Glenn H. Curtiss in January, 1911, at San Diego, California. Captain Fabre in France had built a machine especially for this purpose in 1910; and, while he succeeded in arising from the Seine River, his flights were terminated by unsuccessful landings. Mr. Curtiss used one of his early biplanes equipped with a single pontoon and wing tip floats of his own design.

We may say that 1910 marked the beginning of the era of "scientific" as distinguished from "inventive" development, although by that time several institutions specializing in aeronautic research had been functioning for a few years. Colonel (then Captain) Charles Renard had founded the Central Establishment for Military Aeronautics at Chalais-Mendon, near Paris, in 1884. In 1902-06 the late Gustave Eiffel made experiments with a special apparatus for dropping flat plates and bodies of various shapes from the top of his famous tower.

In 1904 the Aerodynamic Institute of Koutchino, near Moscow, was founded by M. Riabouchinski. Later, suit-

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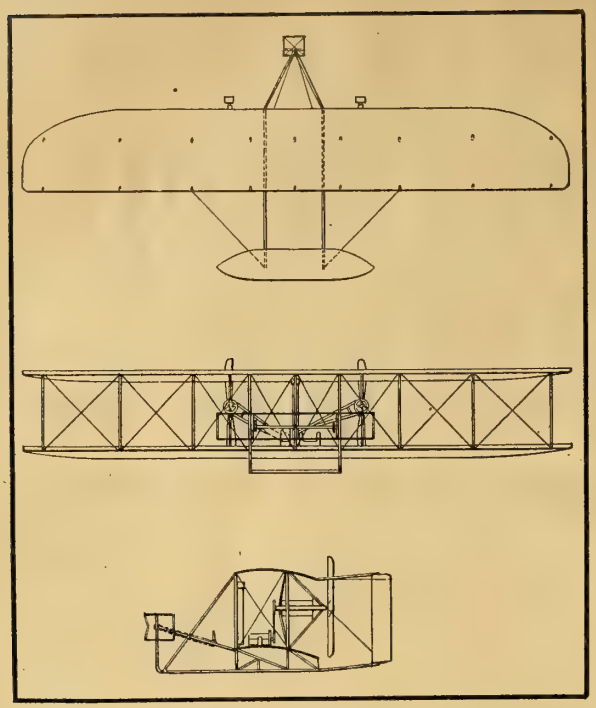
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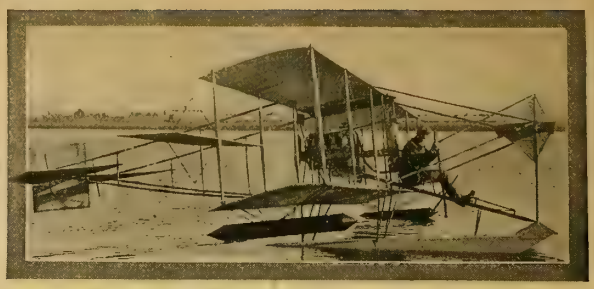
Outlines of the Wright brothers' biplane of December, 1903, the first airplane successfully to carry a man. This machine was powered with 4-cylinder 12 h.p. engine.

able laboratories for aerodynamical studies were built in the various countries—notably at the University of Göttingen in Germany by Professor Ludwig Prandtl; at the National Physical Laboratory, Teddington, England; and by Colonel G. A. Crocco, at the Central Aeronautical Institute in Italy. In 1909 M. Eiffel erected his Champ-de-Mars laboratory. Their methods of testing were patterned somewhat after those which the Wright brothers developed during their experiments of 1901-02.

The theoretical and experimental investigations conducted by the above institutions served as the fundamental basis of modern aeronautical engineering. Experiments were made with accurate scale models of wings, bodies, and various other parts of the airplane—even to the complete model of the machine itself—by suspending them in a large tube, called a "wind-tunnel", through which air was drawn at a high velocity. The model was supported by wires, or from a special type of balance, by means of which the magnitude and direction of the air force (on the model) could be determined. These wind tunnels were constructed in various types, and the information obtained from them was



Members of the Aerial Experiment Association. Left to right —J. A. McCurdy, Lt. Selfridge, Glenn Curtiss, Alexander Bell, and Casey Baldwin.

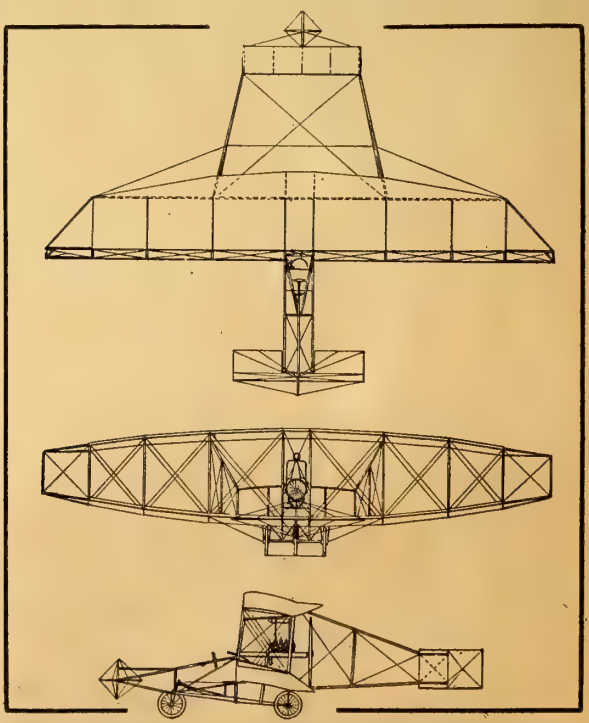


The early Curtiss hydroairplane which was flown at San Diego, California, in January, 1911, the first flight in which an airplane both took off and landed successfully on water.

so valuable that institutions in various parts of the world began to erect them to obtain more accurate data.

By the year 1910 considerable progress had been made also in the development of *theoretical* aeronautics. In 1908 F. W. Lanchester, in England, published his "Aerodynamics." The book had its inception in experiments and studies made by this great pioneer, beginning in the year 1894. It is singular that the Germans, not the English, recognized the fundamental importance of his theories particularly in regard to the generation of lift by wings. A paper containing some of the basic physical concepts of modern wing theory was presented to the London Physical Society by Lanchester, in 1897, and rejected by them in September of the same year. His own deductions in the above volume were largely drawn along non-mathematical lines and were, therefore, not generally quantitative; but his work has now become of great historical importance, for it laid the foundation for the more modern solutions of problems embracing almost every phase of aerodynamics.

(The second part of this article by Mr. Miller, dealing with subsequent developments in aeronautical research, will appear in the January issue of AERO DIGEST.)



Glenn H. Curtiss' "June Bug", the first airplane to make a previously announced public flight in America—1908.

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By Don Rose

Miss Mae Schill, November 25, 1928.
Atlanta, Ga.
Dear Mae,

I'm bogged down here at Philadelphia again with no place to go, it being Sunday which is no kind of a day to spend in Philadelphia anyway, so I take pen in hand to write to the only girl I ever loved, which means you and nobody else but. I should of been out of here before now, but coming up the line, I didn't no more than get out of Washington when I ran into pea-soup so thick you could of ate it off a knife. Rightly I should of come down, me being a great one for obeying orders whenever I think of it, but at the moment I was thinking of you or something, and then I had it on my mind I left my fountain pen in Philly and I know that Philly bunch well enough so that I came right on through. The steam was coming thick off the Delaware or somewheres and I didn't like it for sour apples, but it thinned out some near day-break and I made what I would call a perfect landing down there in the puddles. So I told them so far as I care they could hire a special train to run the bags on to New York, for I want to tell you when weather is thick in Philadelphia it's *thick* and liable to get thicker. And here I am, wondering what I'll do with a whole Sunday unless I go to church, which don't seem likely at the minute.

So I got to tell you I still love you just as much as I did last Tuesday, and there ain't a girl I ever met or ever will can give me the run-around and make me like it the way you do. I been thinking of you every trip I made since we met at Bill's place, and if it wasn't that I'm a pilot first of all and got good flying habits, as even the boss will tell you, I'd be navigating by compass most of the time since a man as deep in love as I am can't usually fly by the nose the way he should. Maybe that's why they put a compass on these mail trucks, since there's some of these cloud-hoppers would get to thinking of their girls and be half way across to Ireland before they got wise to the fact their feet was likely to get wet.

But about Bill, I don't want you should trust him a lot just because he seems to expect it. Bill's a nice guy and as handy around a Whirlwind as any man I ever see, but you should ought to remember he ain't rightly more than a mechanic and you got to watch him. Mechanics will steal anything you got except your flying time, and I wouldn't put it past no mechanic, not even Bill, to steal a guy's girl while he's out on the route. I gotta fly this mail, and if Bill gets gay he'll do a nose-dive for me when I get back to Atlanta, which ought to be inside a week or two, if this fog don't settle here for the winter.

I got your letter and it's swell. But dearie, though I'd like right well to get you what you want in New York, you got to remember we don't land the mail on Fifth Avenue—at least we ain't none of us done so as yet. And from what I hear, this place Macy's is somewheres down underneath the elevated, and for me to leave my ship long enough to go down there wouldn't be just right, and would expose me to all the temptations of the city which I been trying to avoid ever since I met you. And if I should tell you what I know about the Quiet Birdmen when they have their meetings in New York you would feel the same way about it, and not ask me to buy your dress goods there for anything. I'd do anything in the world for you, but a man's got to look out for his morals, particularly when he's in love with the sweetest girl in the world, meaning you.

Fog's thinning out a bit. Guess I'll get a bite to eat and tune up to move on. I won't have to go to church after all.

Your devoted admirer,

LARRIE.

Miss Carol Rambeau, November 25, 1928.
Spartansburg, S. C.
Dear Carol,

I got your letter and would of answered it before but I been flying weather so thick I've about forgot what the nose of the ship looks like, and here I am sunk without trace in Philadelphia with nothing to do but sit around and think about you until they blow the fog back where it came from. So I take pen in hand to write to you and must first tell you again that you're the only girl I ever loved and don't let anybody tell you different. There's Mark Munson may try to tell you I had another girl one time out in Michigan, but you got to remember he ain't nothing but a mechanic and don't have the right sort of ideals about such things, and if he gets fresh with you, I'll bust him loose from his engine mount when I get back to Spartansburg.

But sweetheart, you shouldn't ought to get peeved with me just because I didn't fly over the house last Monday. I gotta fly this mail and I was fifteen minutes late out of Atlanta, and they had me loaded with mail order catalogs or something, and the old bus was so nose-heavy I got blisters yet from pulling her out of the scenery. I'd of come around your way if I could, and how was I to know your cousin from Iowa was visiting with you and wanting to see your boy-friend go by on his way north? And about this cousin of yours, would she for instance be a blonde or the other kind, not that I care at all but I'm just kind of curious. Give her my regards anyway, and if she's still around next week maybe we might take in a movie together, just us three, or if you didn't care to go I'd show her a good time with maybe supper and a show. Not that I care about any other girl but you or ever would, but maybe you would want your friends to know the sort of guy that's sweet on you.

It looks like Philadelphia maybe is coming up for air again, so I guess I'll give the bus some oats and be on my way. Give my love to your mother.

Yours ever and ever,

LARRIE.

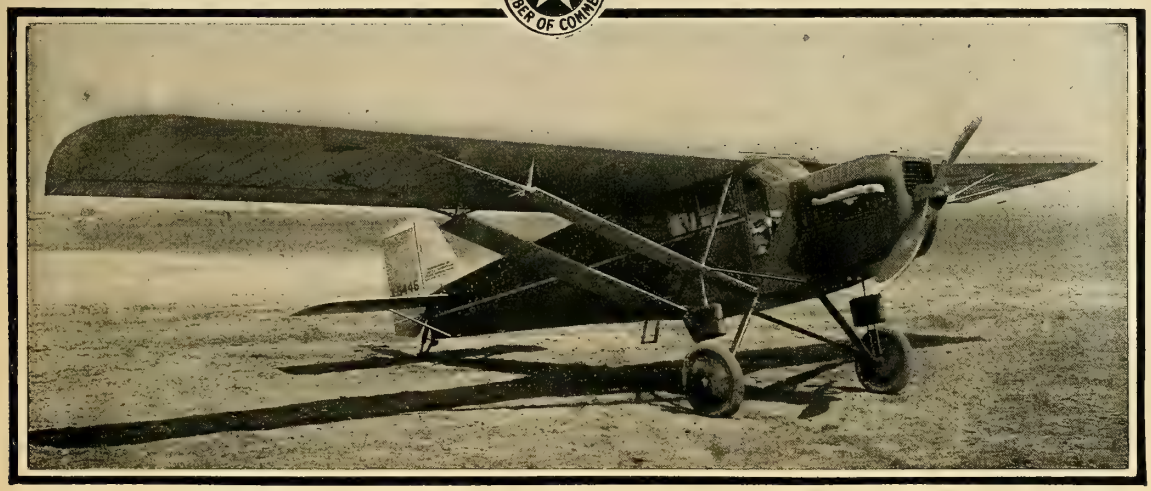
Miss Elsie Kemble, November 25, 1928.
Greensboro, N. C.
Dear Elsie,

The only reason I'm glad to be stuck here in Philadelphia on a wet Sunday is that I can sit here and dream about you and write you a line to say I'm doing fine, and love you like I told you last Wednesday out on the porch after Hank Schneider went home, the big bum. What did he want to come around for, the only evening I seen you in two weeks? If that ain't just like a mechanic.

I been thinking about what you asked me to do for you. Now you know, dearie, that I'd do anything to make you happy, and I sure would like to hop over to Greensboro and stunt a few for your Sunday School class, and even though I says it as shouldn't, there ain't many can match me or even crowd me when it comes to making a ship do parlor tricks. But I got to tell you that this old bus of mine ain't as young as she was, and while there ain't anything exactly the matter with her that you could put a monkey-wrench on, she's getting just a little stale here and there. She still looks

(*Continued on page 1284*)

BUILT for Durability



WHEN the Curtiss-Robin was designed, every effort was made to use the finest quality materials. These were selected as standard only after thorough tests had proved them the best for their special purposes.

For example, Curtiss engineers specified Chrome-Molybdenum steel tubing throughout the fuselage because it has an ultimate tensile strength of 95,000 pounds per square inch . . . . almost twice the strength of ordinary carbon tubing. After all joints are welded, the fuselage has all the advantages of one-piece construction . . . . rigidity, ruggedness and durability.

Similarly, one-piece stamped ribs of Alclad were selected for the wings, because they combine unusually great strength with light weight and positive resistance to corrosion.

Detail after detail, the Curtiss-Robin proves itself a plane that's built to last. It is built for safety, too. Let us prove to you that this ship solves a number of problems for transport and taxi companies, flying schools and private owners.

Inspect the Curtiss-Robin at the Chicago Aeronautical Exposition

Curtiss Robin

CURTISS FLYING SERVICE

INCORPORATED

GARDEN CITY, LONG ISLAND, N. Y.

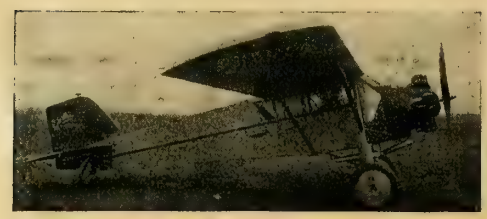
And their distributors: Sole Sales Agents in the United States.

Manufactured by CURTISS-ROBERTSON AIRPLANE MFG. CO., Anglum, St. Louis County, Missouri

Install the "Challenger" Engine in *Your* Ship—



Travel Air; 3-place Open Cockpit Plane with Curtiss "Challenger" installed.



Robin; 3-place Cabin Monoplane with Curtiss "Challenger" installed.



Fledgling; Open Cockpit Training Type with Curtiss "Challenger" installed.



Fairchild; 5-place Cabin Monoplane with Curtiss "Challenger" installed.

It Gives You:

Smoothness: The "Challenger's" unique arrangement of six cylinders on a two-throw crankshaft provides more perfect dynamic balance than is obtainable with any single row radial type of engine. For this reason the "Challenger" is exceptionally smooth in operation.

Reliability: One-two-three 50 hour runs on the block, plus hundreds of hours of flight-testing in the air—have established the unfailingly reliability of the "Challenger" engine, a fact attested everyday by "Challengers" in actual service.

Economy: Casey Jones on a recent 6000 miles transcontinental flight with a Curtiss "Challenger" averaged 11½ miles to the gallon of gas, without any expense for replacement or repairs.

And—

Curtiss Engineering Cooperation

With every "Challenger" goes the assistance of the Curtiss Engineering staff in designing your installation so that the "Challenger" may bring to *your* ship 100% of its known smoothness, reliability and economy.

The "Challenger" is the product of the same engineers who have produced engines for the U. S. Army & Navy planes with noteworthy success. Now the "Challenger" affords the same kind of performance in commercial use.

Eight representatives manufacturers have already purchased "Challengers" for immediate installation in their aircraft. If you want a "Challenger" for the coming season, better place your order now.

Inspect the CURTISS "CHALLENGER" at the Chicago AERONAUTICAL EXPOSITION

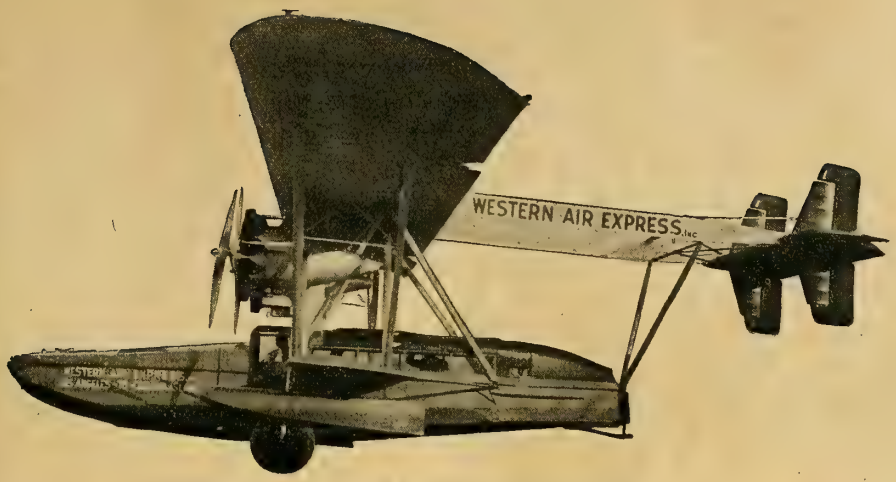
CURTISS FLYING SERVICE

INCORPORATED

GARDEN CITY, LONG ISLAND, NEW YORK

Sole Sales Agents in United States

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FROM COAST *to* COAST
IN A
SIKORSKY AMPHIBION

THE first transcontinental flight of a commercial amphibion has just been made from Curtiss Field, New York, to Los Angeles—and, of course, by a SIKORSKY AMPHIBION. Major C. C. Moseley, Operations Manager of the Western Air Express, Inc., who made the flight, accompanied by Arthur Goebel, of Hawaiian flight fame, is enthusiastic over the plane's performance, as his telegram shows.



WESTERN UNION

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ATTENTION MR SIKORSKY COLLEGE POINT LI NY=

ARRIVED YESTERDAY NOON OK HAD ENCOUNTERED SEVERE STORMS AND HEADWINDS INCLUDING SNOWSTORM STOP SHIP HANDLED PERFECTLY NO ADJUSTMENTS OR REPAIRS OF ANY KIND ON EITHER SHIP OR ENGINES THROUGHOUT TRIP STOP CAME VIA DAYTON STLOUIS ALBUQUERQUE WINSLOW LOSANGELES SHIP TOOK OFF LANDED PERFECTLY IN HIGH ALTITUDE FIELDS WAS EXCEPTIONALLY STABLE IN ROUGH AIR WELL PLEASED WITH SHIPS PERFORMANCE LETTER FOLLOWS=

C C MOSELEY. 708A

GUARANTEES This wonderful craft, which is equally at home on the land, on the water and in the air, *is guaranteed*—to have a high speed of over 125 M.P.H., to have a ceiling of over 20,000 feet, and to fly—and climb—*on one motor* with pilot, mechanic, nine passengers and gasoline for a five hour flight.

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Curtiss

AIRPORT AND AIRWAY NEWS

A section devoted to the progress of airlines, airports, airways, radio, lighting and other auxiliary services

By

Edgar H. Felix

Edgar H. Felix, the author of this article, has gained a widespread reputation as a popular writer on technical subjects. He is a member of the Institute of Radio Engineers and the American Institute of Electrical Engineers, and is Radio Consultant to the National Electrical Manufacturers Association. During the war, he was a radio engineer with the Signal Corps and became actively interested in aircraft radio development at that time. Subsequently, he was, for a number of years, associate editor of "Aerial Age Weekly" and a consulting expert on commercial radio broadcasting. He is also well known for his special articles in "Radio Broadcast", "Radio Retailing" and "Advertising and Selling", and for his book, "Using Radio in Sales Promotion", which is the textbook of the broadcast advertising industry. This wide technical and writing experience particularly fits Mr. Felix to write articles on the auxiliaries of aviation and, beginning with the January issue, he will chronicle, in a special section of Aero Digest, the monthly progress in the vital auxiliaries of aerial navigation—the airports and airways—which is the subject of this, his first article in this publication.

IMPERCEPTIBLY, an age of specialization enters to mark the maturity of the aviation industry. Aviation is no longer the exclusive business of pilots, any more than the automobile industry is one of chauffeurs, and railroading of locomotive engineers. Engineer-pilots gave aviation birth and pilot-heroes have made the world conscious of its place in industry. These have done their part nobly and effectively, and they will continue to lead the way. But the great burden of insuring the continued march of progress lies today with the auxiliary services, the organization backing the pilot and his ship of the air.

Aircraft must ultimately be guided from airport to airport by means of radio beacons which lay down an infallible path along completely equipped airways. Marker beacons must serve as block signals to warn unfailingly of dangers besetting the path of the air. Instruments must be developed which automatically and reliably indicate the height of the plane above ground, regardless of fog or snow. Airports must be complete havens of service to plane, passenger and pilot. It is the perfection of these instrumentalities and services which will set aviation free of its narrowing limitations.

When aerial transportation comes to its own, the airport terminus will be a magnificent plant which will make the best of present day landing fields look like the lonely way station along the railroad track. Numberless airliners will arrive and depart according to precise schedules, linking with bus and train services, coördinated for rapid distribution of passengers and freight. Hotel and restaurant facilities will appear with a growing passenger trade. Lighting and communication facilities will contribute markedly to the maintenance of reliably organized air transportation. Inventions and developments are even now being made which will rapidly change aviation from an adventure into a transportation business.

Recent progress in aircraft radio communications is perhaps the most significant development of the many adjuncts to aerial transportation which will soon bear fruit. It was not so long ago that radio brought only meagre weather bulletins to disturb the pilot. Already, the radio beacon is laying down a course along some of our principal highways of the air with satisfactory precision and reliability. The pilot is no longer called upon to manipulate a radio receiver; the beacon automatically operates an indicator on the instrument board showing the pilot whether he is on or off his course and whether he is to the right or to the left of it. It will not require long experience with this device before it may automatically guide the plane along the indicated course.

But even this is only a meagre beginning of what radio has to offer aviation. The science of picture transmission by radio is developing rapidly, and it is not unreasonable to expect that the pilot on the long distance flight will be served with frequent weather maps, made automatically by radio while the plane is in flight.

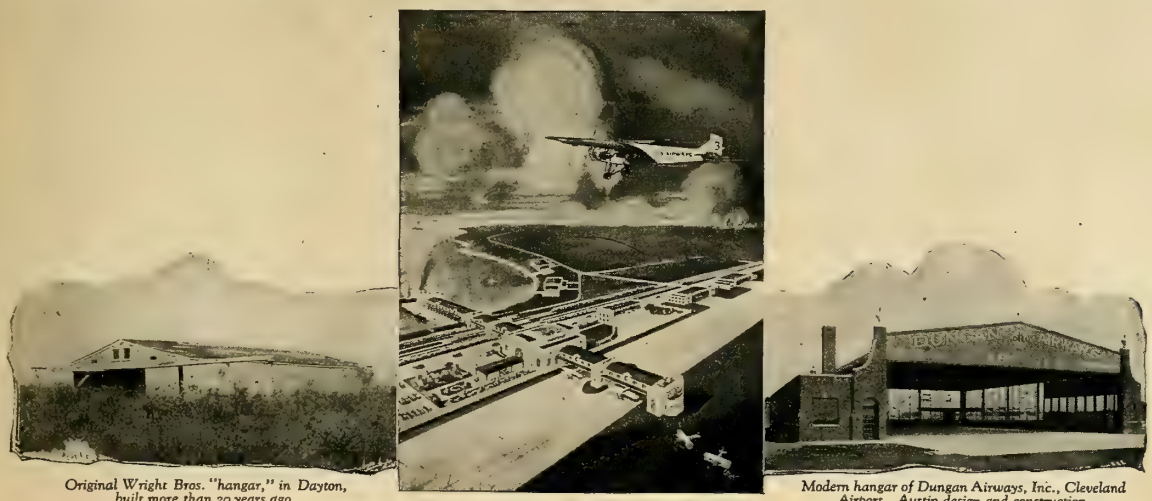
The science of photoelectricity, electrical response to light waves, also holds much promise as an adjunct to aerial navigation. The search for practical television, in which the photoelectric cell plays a leading part, will yield a by-product to aviation infinitely more useful than television itself. The photoelectric cell is a device which sets up a minute electric current in response to variations of light upon the cell. The output of a photoelectric cell may be amplified by the conventional vacuum tube amplifier to light beacon light indicators on the instrument board and even to control the course of the plane itself. By employing different light frequencies for beacons along an airway, it is possible to identify automatically each beacon as it is passed. In fact, it may be possible, some day, to indicate a plane's position on a chart automatically by means of a photoelectric system controlled from the ground and coördinated with selective beacons, much as the movement of trains in railroad yards is indicated in the signal control towers on a map of glass tubes, each of which becomes luminous as a train moves along the section of track which it represents.

Only one close to the development of radio and the associated science of photoelectricity is likely to consider my speculations as anything less than fantastic. But I regard the technical development of the airport, the airway, radio devices for aerial navigation and safety devices as being as important to the future development of commercial aeronautics as is the forthcoming progress in the science of aerodynamics itself. It has been necessary to conquer the air but, that accomplished, we must now develop the adjuncts necessary to build aerial transportation from a conquest to a business.

As an indication of the practical progress made in these directions, I quote from a paper in the Proceedings of the Institute of Radio Engineers, prepared by Dr. J. H. Dellinger, formerly in charge of radio work at the Bureau of Standards and now chief engineer of the Federal Radio Commission, and Haraden Pratt, of the Bureau of Standards, entitled "The Development of Radio Aids to Air Navigation":

"The development of aircraft has reached a stage where further progress depends upon the conquest of adverse meteorological conditions. The most promising avenue to such mastery of the elements is through adaptations of radio. Intensive work extending over two years has resulted in the development and practical demonstration of a complete set of radio aids to flying on the civil airways of the United States. This development was carried on by the Bureau of Standards for the Aeronautics Branch of the Department of Commerce.

"The radio aids, which will now be installed on the principal airways, comprise *(Continued on page 1294)*



Original Wright Bros. "hangar," in Dayton, built more than 20 years ago.

Modern hangar of Dungan Airways, Inc., Cleveland Airport. Austin design and construction.

Progress in Airports and Aviation Buildings

Representative Austin Clients in the Aviation Industry

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Pontiac Airport

THE pictures above tell their own story—the original Wright "hangar" of twenty years ago, a modern hangar of Austin design and construction, and an air-rail-water-highway terminal of the future. So fast is this aviation industry moving, airport planning must look years ahead lest the facilities provided for now be hopelessly obsolete in a short time.

Austin has finished recently or has now in progress *nine* complete airport surveys in *five* states from coast to coast. This survey and report service has been instituted by the Airport Division of the company to enable municipalities and others contemplating airport facilities to proceed on an absolutely sound and economical basis.

For information regarding this service, or for efficient hangars and other aviation structures, get in touch with Austin. Approximate costs and other valuable data will be furnished promptly.

Wire, phone the nearest Austin Office, or mail the memo

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New York Chicago Philadelphia Detroit Cincinnati Pittsburgh St. Louis Seattle Portland
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Memo to THE AUSTIN COMPANY, *Cleveland*— We are interested in a

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AD 12-28

THE AUSTIN METHOD

"USE THE AIR SERVICE"

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PERSONAIRLITIES



by Caldwell

FOR several months now I have been pained, hurt, and grieved by the generally low literary tone of this department. I have stayed awake nights thinking about it, sobbing gently to myself until finally tired nature collapsed, and I fell asleep, or fell under the table—according to where I happened to be when I was doing my thinking, or drinking, as the case might be, and usually was, to be candid with you. Not that I blamed myself, mind you! No, no! Like the patient photographer summoned to take a picture of Arthur Caperton, I did the best I could with what I had to work on. I mean, the biographies of these pilots, of course. Honestly, I have done the best I could with them, fighting desperately to inject a high literary flavor into the lives of men essentially low in literary content. But it can't be done. A simple pilot, a simple pilot remains—and I've been absolutely staggered at times to note how simple he is, *en masse*. Mention Shakespeare to him, and he will look at you in wonder; mention "Arrowsmith" and he will imagine that you are discussing a new style in Arrow Collars; speak of "The Bridge of San Luis Rey" and his wandering mind will vision the Erie Canal or the Brooklyn Bridge. You can't do a thing with him—except buy him a drink.

But at last, my six faithful sufferers, I am able to present to your notice and hold up for your admiration and applause a real literary pilot, a man who has climbed from the humble cockpit to the dizzy eminence of an Editor's Chair—and you have no idea how dizzy some editors can get in that chair. Fellow low-brows, let me have the honor of presenting the Editor of "Air Adventures"—Mister Casey Jones, himself, in person—not a moving picture, as Dave Levy would say. Just step a little closer to the microphone, Mister Jones, so we can hear you without first washing our ears. But stop—! Let the Publisher of "Air Adventures" introduce Mister Jones, as he does



"Casey" Jones—Editor

in the first number of that thrilling magazine, whose advertising pages carry the following advice to trusting readers: "French Love Drops—an enchanting exotic perfume of irresistible charm, clinging for hours like lovers loath to part. Secrets and everlasting Oriental Passion-Flowers, Free." I don't know if Casey edits the ads or not, but somehow this doesn't sound exactly like him! Certainly, it is not as I know him. But then—one never knows, does one? Another ad: "I'll teach you Real Professional Magic at home—by Mail." I must stop playing poker with Casey—he's getting too near the real sources of information. Also, "Match your coat and vest with new trousers." And hear this: "New Bodies in 24 hours—in the privacy of your own room. Now, only $2.00—Giant Chest Expander." I suppose that has something to do with the "Secrets and Oriental Passion-Flowers, Free." Well, well! How Casey has progressed. But here's his biography, hot from the Publisher's pen:

"As early as 1912 CASEY JONES sat at the controls in flying machines that were about as safe as crossing Forty-second Street at Broadway during a five-alarm fire. Then, before the United States declared war on Germany, he enlisted in the Army Air Service. In November, 1917, he went overseas, graduated from advanced training at Issoudun, France, and for some time he served there as an instructor. In August, 1918, he went on to the Front with the 95th French Pursuit Squadron. He remained there till the end of the war. He returned to the States in January, 1919, and became one of the chief officials of the Curtiss Aeroplane and Motor Co. at Garden City. In the Spring of 1919 he organized the Curtiss Flying Service. During his association with the Flying Service he competed in practically all of the National Air Races, starting with the New York-Toronto race in 1919, and winning a great number of trophies at Kansas City, Omaha, Detroit, St. Louis, Dayton, Mitchel Field, and Philadelphia at the annual air races. Casey Jones makes his bow to all readers of AIR ADVENTURES."

Well, make your bow, Casey; and then go and buy yourself a big blue pencil and get to work with it—for from the contents of your new magazine, which I have examined with shocked surprise, I am sure you are going to need it, and also a pencil sharpener. And just a hint to aspiring authors who have manuscripts to sell—don't take them in to the Editor yourselves. Just hand them to a small, good-looking blonde, and tell the blonde to walk right in with a large smile.

NOW, one item like that about a pilot is enough to snap this department out of its literary torpor, but another along the same lines should put me in the running for the Pulitzer Prize. And I have another—Miss Amelia Earhart, the first woman to cross the Atlantic with the assistance of three Whirlwinds and two men, whom the public has already forgotten, so why should I mention them? Miss Earhart, an associate editor of *Cosmopolitan Magazine*, will conduct a department devoted to the popular phases of aviation. As this is the first aviation department to be conducted by a major popular magazine, we may announce that a flock of innocent grease monkeys now may be induced to purchase *Cosmopolitan* and thus learn from Madame Elinor Glyn all about "IT". For Madame Glyn does a little snappy sex stuff for *Cosmopolitan*. And how nice that will be for the boys. I'm looking for various complexes to develop in my mechanic. And then I don't suppose the poor young chap will be worth a damn. I had just about got him to the point where he was willing to believe that whisky would get him into less trouble than women, but if Madame Glyn takes a crack at him I fear all my good teaching will be wasted. Oh, Miss Earhart—why in the world can't you write for "The Christian Science Journal"?

But just a word, Miss Earhart, from an old fat man who for some years has been successfully kidding a publisher into paying him real money for unrealities. You're a

(*Continued on next page*)



Amelia Earhart—Editor

An Experience as Old as the Airplane



GOODYEAR men were thrilled when word of the first successful airplane flight reached Akron.

Even before that epochal day, Goodyear had visioned an aerial age. Goodyear was, as the saying is now, "air-minded."

Naturally, Goodyear men were tremendously interested in the development of the heavier-than-air-ship.

They gave unstintingly of their efforts and experience to assist the development of the airplane.

Many of the very first planes were equipped with Goodyear *bicycle* tires, specially-made and fitted for airplane purposes.

And as the design and construction of airplanes has progressed, Goodyear has kept pace. Not only in the improvement of tires, but in the development and perfection of numerous uses for rubber.

Rubber grommets, rubber shock absorber compression discs, aircraft radiator and gasoline hose, rubber couplings, rubber tank covers, rubberized fabrics—Goodyear has met every requirement for articles of this material to contribute to the efficiency of the modern plane.

And today, Goodyear stands ready to do everything within the ability of The World's Largest Rubber Company to assist the men who design, build, or fly airplanes.

For information on "everything in rubber for the airplane" write or wire

Aeronautics Department

THE GOODYEAR TIRE & RUBBER COMPANY, INC., AKRON, OHIO

GOODYEAR

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AIRPLANE TIRES

(*PersonAIRlities continued*)

budding writer; I'm an old one, stunted in the bud and almost gone to seed—you'd be shocked if you could see how seedy I look. So have I your pardon for presuming to give you just a word of advice? Have I? Well, then: always write what you think your reader would like to read. If you were writing for my six rough-necks, for instance, you would have to write on sand-paper, as I do. But for the sweet folk who like those palpitating endings, you must write, roughly, as follows: "He stood stiffly beside the plane, glooming at her; his lips were tense, his back was tense, even his field boots were tense with emotion. He was almost past tense, and just full of IT. 'I love you,' he gritted. 'Do you!' she panted. 'I do!' he gulped. 'I knew it!' she hiccoughed. 'My own!' he hoarsed. His arms opened wide, like hangar doors. She zoomed into them and landed with a crash, gurgling happily, like an OX5."

Well, the best of luck to you, Miss Earhart. Writing is a funny—and frequently an annoying—trade. But may you be successful and happy in it. And may you get as much fun out of it as I do.

THOSE who have seen a Metro-Goldwyn-Mayer screen production directed by Fred Niblo may not have suspected what a daring aviator Niblo used to be when he was a ham actor, back in 1909. He still flies, but it takes considerably less daring than it used to take. Consider the means by which Pilot Turpin steers the craft of which he seems to be so proud. The feet do nothing but brace themselves—and well they may! Well they may! The right hand grasps the trusty right lever and shoves it ahead or hauls it back, thus warping the wings to put on bank—and incidentally, straining the wing structure. The same hand, moving the small hinged top part from left to right and from right to left, actuates the rudder. The left hand, grasping the smaller left stick, causes the elevators to move up or down at the discretion of the manipulator—and let discretion be your guide. The little Wright engine, by means of gears and chains, drives two propellers at such furious speed that you can hardly count the revolutions—unless your eyesight is good, when you may do it easily. No belt is worn in this snappy sport plane of 1909, but the pilot and passenger cannot fall out without breaking the piano wire braces in front of their chests. And that was only 19 years ago. How far has the battleship advanced in the same period? (Question mark?) And how long does it take a squadron of modern bombers to send a battleship to the bottom? (Full stop.) And how are you, Mr. Wilbur! (Exclamation point!)

LIEUT. PAUL E. RICHTER, JR., vice president of the Aero Corporation of California, took five prizes for speed and efficiency in the National Air Races in 1927, and holds the World's Altitude Record for OX5 motors. Richter was born in Denver, attended the University of Colorado, and served in the Field Artillery during the war. He did no flying in the war, but since then has flown over 2,000 hours, has flown across the continent twice, and flown in 30 states. With Jack Frye he manages one of the livest flying organizations on the West Coast and has done a great deal of good work.



Lt. Paul Richter, Jr.



Pilot Turpin and Fred Niblo in their Wright Model B. (1909)

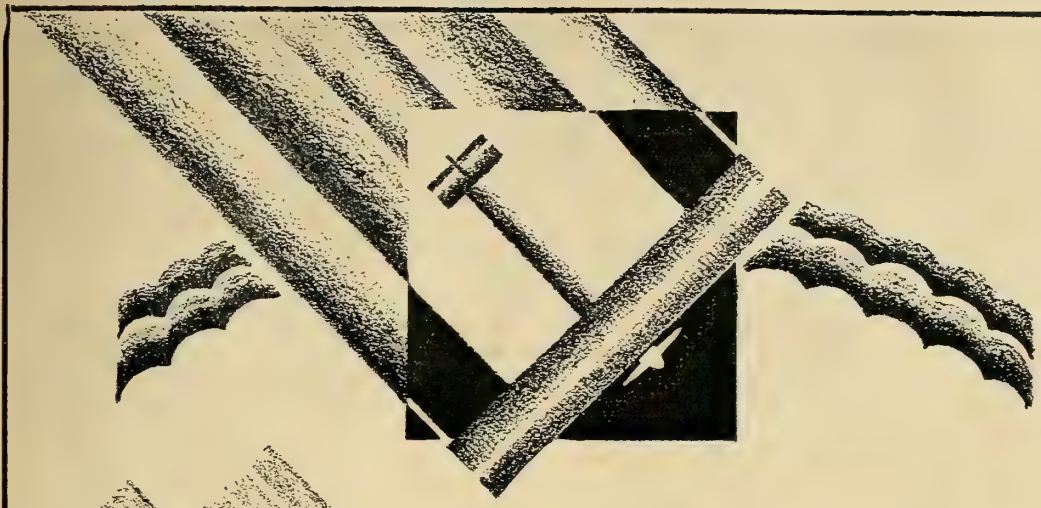


Doug Davis and the bale of cotton

HERE is Doug Davis, of the Davis Fying Service, Atlanta, Georgia, who recently flew what is probably the world's most expensive bale of cotton from Candler Field, Atlanta, to New York City. The bale sold at auction for $5,000. It was compressed into a bale five feet long and two feet square and weighed 430 pounds—and they got $5,000 for it, not counting the boll weevils, if any, which were thrown in free, along with a couple of hook worms. You see, the bale was flown to the National Headquarters of the Democratic Party and auctioned off, the proceeds to go to the Campaign fund. Those cotton farmers who have been complaining about the price of cotton probably haven't heard of this new market. Boys, you should sell your cotton to the Democrats. No use trying to sell cotton to the Republicans—they're all rich enough to buy silk. If they're not, Harry Sinclair will contribute enough for them to do so, getting well oiled in the process.

Speaking of Candler Field, Atlanta, that's just what it is—a field. It isn't an Airport. Mr. Candler, although I don't know the details, probably has done his part in getting the field to its present shape. But the City of Atlanta should not be content with a mere field, and not a good field, either. It should take in more land, and also fix up the present land, and make a real airport for a city that is badly in need of one. I flew down there recently and intended taking several passengers for a flight. But the wind was blowing from a direction that made a take-off with full load a somewhat doubtful undertaking; and passengers should not be flown when even the *possibility* of a crash exists. I made one flight alone to show the passengers that the plane didn't have too much room, even with only the pilot aboard. Then we all went back to the hotel and had a drink at the Wholesale Druggists' Convention. That's about like a pilots' convention—the druggists were more interested in liquid chemicals than they were in drugs. Incidentally, I found that half the Southern Baptists and Methodists were going to vote for Al Smith—and if he wanted the other half all he'd have to do would be to join the Baptist Church. I understand from Earl Cone that the Baptist Home Mission Board is now looking for a Treasurer with one arm—and the other one tied behind him.

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Write for Information. Special application blanks have been mailed. Did you get yours? If not, write Aircraft Bureau, Board of Commerce, Detroit, Michigan.

CONVENTION HALL
DETROIT
APRIL 6-14, 1929

Chronology of Some of the Important 1928 Aeronautical Events

JANUARY

10th—(Australia). Captain Hood and Lieut. Moncrieffe took off at Sidney, Australia, on a flight across the Tasman Sea to Wellington, New Zealand, in a Ryan monoplane powered with a Wright Whirlwind engine. They have been given up as lost.

10th—The Collier Trophy for 1927 was awarded to Charles L. Lawrance.

14th—Major Bourne, Lieut. Plachta and Master Sergt. Belcher, U.S.M.C., flying a trimotor Fokker transport, made the first non-stop flight from the United States (Miami, Fla.) to Nicaragua. The flight lasted 12 hours and 2 minutes.

20th—(Germany). Richard Wagner, flying a Dornier Superwal (4 Gnome-Rhone-Jupiter engines of 480 h.p. each), established a world's speed record of 130.1 m.p.h. for 62 miles for seaplanes with a useful load of 2204 pounds, returning to point of departure.

23rd—(Germany). Richard Wagner, flying a Dornier Superwal, established a world's altitude record of 9334 feet for seaplanes with a useful load of 8818 pounds.

24th—(France). M. Paillard, flying a Bernard monoplane powered with a 420 h.p. Jupiter engine, established a world's speed record of 135.6 m.p.h. for airplanes with a useful load of 2204 pounds over a 620-mile course, returning to point of departure.

27th—The rigid airship *U. S. S. Los Angeles* was successfully landed on the deck of the airplane carrier *U. S. S. Saratoga*, about 30 miles south of Newport, R. I.

FEBRUARY

2nd—(Germany). Richard Wagner, flying a Dornier Superwal powered with 4 Gnome-Rhone-Jupiter 480 h.p. engines, established world's speed records of 110.15 m.p.h. for seaplanes with a useful load of 2204 pounds over a 620-mile course returning to point of departure, of 130.1 m.p.h. and 111.48 m.p.h. for seaplanes with a useful load of 8818 pounds over 62 and 310 miles, respectively.

5th—(Germany). Richard Wagner, flying a Dornier Superwal established a world's duration record of 6 hours, 1 minute, 56 seconds and a world's distance record of 621.46 miles for seaplanes with a useful load of 8818 pounds.

7th—(England). Bert Hinkler took off at Croydon aerodrome, London, on a flight to Port Darwin, Australia. Flying an Avro Avian with a Cirrus engine, he included the following points in his trip: Rome, Malta, Tebrock, Ramleh, Basra, Jask, Karachi, Cawnpore, Calcutta, Rangoon, Burmah, Singapore, Bandoeng, Bima and Port Darwin.

12th—(Africa). Lady Heath left Cape Town, South Africa, on a solo flight to England. She flew an Avro Avian powered with a Cirrus engine.

13th—Col. Charles A. Lindbergh landed at St. Louis, Mo., having completed his Latin-American good-will flight. The flight began December 13, 1927, at Washington, D. C., and the itinerary included Mexico City, Guatemala, Belize, San Salvador, Tegucigalpa, Managua (Nicaragua), San Jose (Costa Rica), Colon, Panama, Cartagena, Bogota (Colombia), Caracas, Maracay (Venezuela), St. Thoms (Virgin Islands), San Juan, Santo Domingo, Port au Prince, Havana and St. Louis. He flew in the *Spirit of St. Louis*.

21st—Harry J. Brooks, flying a Ford monoplane with 36 h.p. Ford engine, established a world's airline distance record of 972 miles for light airplanes weighing (empty) 440-771 pounds. He flew from Detroit to Titusville, Fla.

23rd—(Australia). Bert Hinkler landed at Port Darwin, Australia, having completed his flight from England in an Avro Avian with Cirrus engine in 15½ days. This was the first solo flight from England to Australia.

26th-27th—The airship *U. S. S. Los Angeles* made a non-stop flight from Lakehurst, N. J., to Panama, covering a distance of 2,178 miles in approximately 40 hours.

MARCH

1st—A Loening amphibian powered with a Liberty engine started on the first amphibian flight across the American continent. The itinerary extended 3,300 miles and included stops at Washington, D. C., Zanesville, Dayton, St. Louis, Kansas City, Ft. Riley, Amarillo, El Paso, Tucson, and concluded at San Diego on March 9, 1928.

9th—Loening transcontinental amphibian landed at San Diego, Cal., completing the trip in 32 hours and 45 minutes flying time.

9th—(England). Lady Mary Bailey took off at Croydon aerodrome, London, on a flight to Cape Town, South Africa. She flew a D H Moth powered with an A.D.C. Cirrus 30-80 h.p. engine.

14th—(England). The Hon. Elsie Mackay and Captain Walter Hinchcliffe, flying the Stinson monoplane *Adventure*, took off from Cranwell in an attempt to fly the Atlantic. They have been given up as lost.

19th—(Australia). Captain W. N. Lancaster, pilot, and Mrs. Keith Miller, passenger, flying an Avro Avian powered with a Cirrus engine, landed at Port Darwin, Australia, completing their flight from England. This flight, which began October 14, 1927, at Croydon aerodrome, London, was the longest ever participated in by a woman.

30th—Eddie Stinson and George Haldeman, flying a Whirlwind powered Stinson-Detroiter, established a world's endurance record of 53 hours, 36 minutes and 30 seconds.

30th—(Italy). Major de Bernardi, flying a Macchi 52 seaplane with a Fiat type AS3 engine, established a world's speed record of 318.62 m.p.h.

APRIL

3rd—(France). Captain Girardot and Lieut. Cornillon, flying an Amiot S.E.C.M. (650 h.p. Lorraine), took off from Le Bourget Field, Paris, on a flight to Timbuctoo and return, a distance of 6,500 miles, which they made in 65½ flying hours.

9th—Lieut. C. F. Schilt, U.S.M.C., was presented the Congressional Medal of Honor for heroism in Nicaragua.

12th—(Ireland). The Junkers monoplane *Bremen*, type W33L with a 310 h.p. Junkers L-5 engine, took off at Baldonnel, Dublin, on a flight across the Atlantic to America. Captain Köhl and Major Fitzmaurice piloted the plane, and Baron von Huenefeld was passenger.

13th—(Newfoundland). The *Bremen* landed on Greenly Island, Newfoundland, after 36 hours and 30 minutes flying. Köhl, Fitzmaurice and von Huenefeld were later taken off of Greenly Island by rescue airplanes.

14th—(France). Capt. Dieudonne Costes and Lt. Com. Joseph le Brix, flying their Breguet XIX biplane powered with a 500 h.p. Hispano-Suiza engine, landed at Le Bourget, Paris, completing their 35,000-mile flight around the world. The flight, which began October 14, 1927, at Paris, France, included: St. Louis, (west coast of Africa); Port Natal, Rio de Janeiro, Brazil; Buenos Aires, Argentina; Santiago, Chile; La Paz, Bolivia; Lima, Peru; Guayaquil, Ecuador; Panama; Caracas, Venezuela; Baranquila, Colombia; Mexico City; New Orleans; Washington, D. C.; New York; Sharon, Pa.; Detroit; Chicago; Rock Springs, Wyo.; San Francisco. Costes and le Brix went by boat to Japan and continued thence by air to Paris to complete their trip around the world.

14th-21st—The All-American Aircraft Show was held in Detroit, Mich.

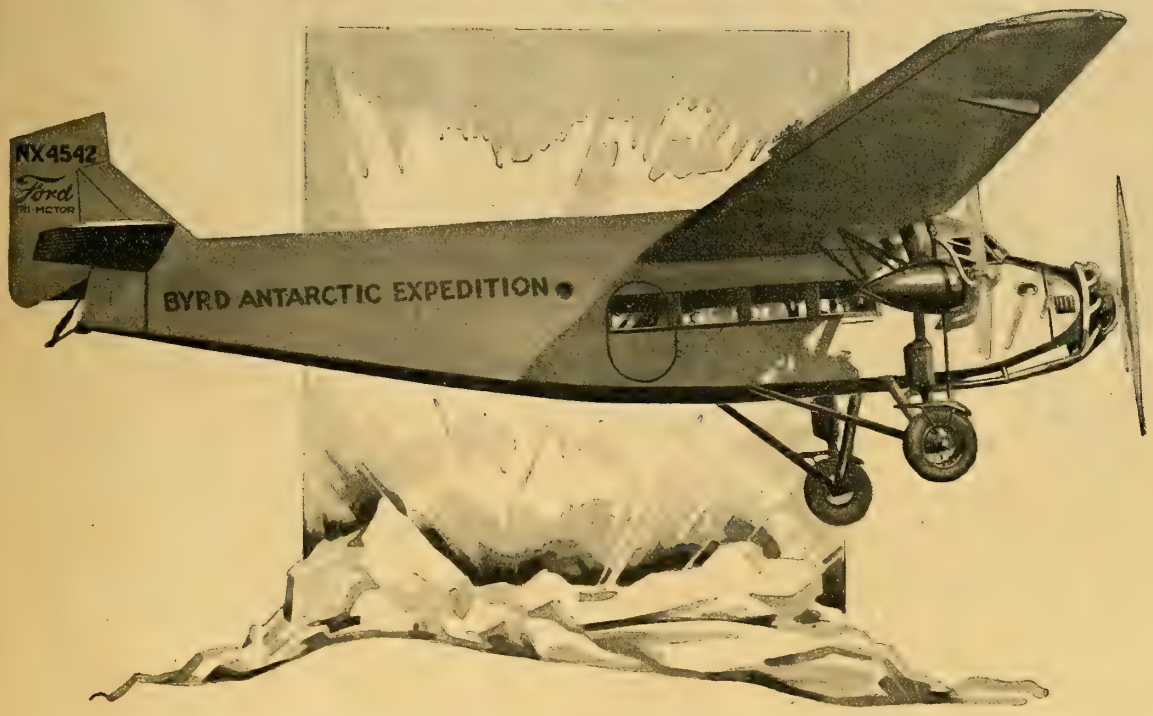
15th—Capt. Sir George Hubert Wilkins and Carl B. Eielson, flying a Lockheed Vega powered with a 225 h.p. Wright Whirlwind engine, took off at Point Barrow, Alaska, on a flight across the North Polar Sea.

21st—(Spitzbergen). Wilkins and Eielson arrived at Spitzbergen, completing their flight across the North Polar Sea.

26th—(France). Commandant Guilbaud, flying a Latham flying boat powered with two 500 h.p. Farman engines, took off from Le Havre on a flight to Bizerta, Tunis, carrying four passengers besides himself. The flight covered about 1,250 miles and required 15 hours and 10 minutes.

27th—(England). Capt. H. S. Broad, flying a De Havilland "Hound" with a Napier-Lion XI 550 h.p. engine, established a world's speed record of 158.65 m.p.h. for airplanes with a useful

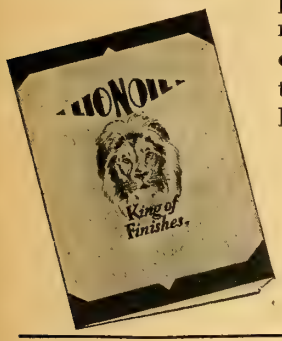
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load of 1102.3 pounds over a 310-mile course. He also set a speed record of 160.28 m.p.h. for planes with a useful load of 2204 pounds, over a 62-mile course.

30th—(Africa). Lady Mary Bailey landed at Cape Town, South Africa, completing her 8,000-mile solo flight from England.

MAY

3rd-5th—Lieuts. Arthur Gavin and Zeus Soucek, flying a Navy PN-12 with a 2 Wright R-1750, 525 h.p. engines, established a world's duration record of 36 hours and one minute for seaplanes, returning to point of departure. (Philadelphia, Pa.)

8th—(France). Captain Pelletier D'Oisy, flying a Potez 29 biplane, took off from Le Bourget, Paris, on flight to Japan. The flight was discontinued at Akyab, India, on May 16.

17th—(England). Lady Heath landed at Croydon aerodrome, London, completing her solo flight from Cape Town, South Africa.

23rd—(Spitzbergen). The airship *Italia* left Spitzbergen on a flight over the North Pole. The *Italia* carried a crew of 15 men, under the command of Gen. Umberto Nobile.

25th—(Spitzbergen.). The airship *Italia* was wrecked on its return flight to Spitzbergen, after successfully crossing the North Pole.

30th—National Elimination Balloon Race began at Pittsburgh, Pa. The race was won by Capt. W. E. Kepner and Lt. W. O. Eareckson, U.S.A.C. Their flight covered 261½ miles.

31st—The *Southern Cross*, a rebuilt Fokker trimotor plane, piloted by Capt. Charles Kingsford-Smith and Capt. C. T. P. Ulm, with Lt. Com. Harry W. Lyon as navigator and James Warner as radio operator, took off from Oakland, Cal., on a trans-Pacific flight to Australia. Stops were made at Honolulu, Fiji Islands and Brisbane, the flight concluding at Sidney, N. S. W., Australia.

31st—(England). Sir Alan and Lady Cobham landed at Plymouth, completing their 20,000-mile survey flight around Africa. The flight, which began at Rochester, England, November 17, 1927, included stops at Bordeaux, Marseilles, Malta, Benghazi, Aboukir, Khartûm, Entebbe on Lake Victoria, Kisumu, Biera, Durban, Cape Town, Luderitz, Lagos, Freetown, Las Potmas, Gibraltar, Barcelona, and Plymouth. They flew a Short "Singapore" flying boat powered with two Rolls-Royce Condor engines.

31st—(Italy). Capt. Arturo Ferrarin and Maj. Carlo del Prete began the flight by which they gained the world's closed circuit distance record of 4,763.7 miles. Their plane was a Savoia-Marchetti monoplane, type S-64, with a Fiat 550 h.p. engine.

JUNE

2nd—(Italy). Ferrarin and del Prete concluded their record closed circuit distance flight (4,763.7 miles). This flight also gave them the world's speed record of 86.47 m.p.h. over a 3,100-mile course.

2nd-3rd-4th—(Belgium). Adj. Louis Crooy and Sgt. Victor Groenen, flying a DH-9, established a world's duration record of 60 hours and 7 minutes, refueling in flight and returning to point of departure.

6th-7th—(Czechoslovakia). Commandant Vichereck, flying an Avia BH-11B with a Walter 60 h.p. engine, established a world's distance record of 1,553 miles for light airplanes weighing (empty) 440-771 pounds. This was a closed circuit flight at Prague.

10th—(Australia). The *Southern Cross* concluded its trans-Pacific flight at Sidney, Australia, having covered a total distance of 7,800 miles in approximately 88½ hours' flying time.

11th—(Mexico). Capt. Emilio Carranza took off at Mexico City on a good-will flight to the United States in the Ryan Brougham. *Mexico-Excelsior.*

14th—(Hungary). Charles Kaszala, flying a Lampich monoplane with an 18 h.p. Thorutzkai engine, established a world's airline distance record of 832 miles for light airplanes weighing (empty) less than 440 pounds. He flew from Budapest to Pola.

17th—Miss Amelia Earhart, in the Fokker trimotor seaplane, *Friendship*, piloted by Wilmer Stultz and Louis Gordon, co-pilot, took off from Trepassey Bay, Newfoundland, on a flight across the Atlantic.

17th—(Norway). Roald Amundsen took off from Tromsoe, Norway, in search of survivors of the airship *Italia*. He has been given us as lost.

18th—(Wales). The Fokker plane, *Friendship*, with Miss Earhart, Stultz and Gordon, landed at Burry Port on the coast of Wales, having crossed the Atlantic in 20 hours and 40 minutes.

23rd—(Spitzbergen). Lieut. Lundborg of Sweden rescued Gen. Umberto Nobile from the ice floe where members of the *Italia* crew were stranded.

27th-28th—Lieut. Arthur Gavin, U. S. N., flying a PN-12 with 2 Pratt & Whitney R-1690, 525 h.p. engines, established a world's altitude record of 19,593 feet for seaplanes with a useful load of 2204 pounds. (Philadelphia, Pa.)

29th—(France). The Paris Aeronautical Salon opened. (Ended July 15, 1928).

29th-30th—The National Model Airplane Contest, in which more than 300 boys participated, was held in Detroit, Mich.

30th—The National Air Tour started from Detroit, Mich. Twenty-four planes participated in the tour, which extended over 6,000 miles through 32 cities and 15 states, ending July 28th.

30th—The Gordon Bennett International Balloon Races started from Detroit, Mich. Twelve entries from seven nations participated in the race, which was won by the U. S. Army balloonists, Capt. Kepner and Lieut. Eareckson. The United States acquired permanent possession of the trophy, since this was the third successive year in which Americans have won the race.

30th—Capt. C. B. D. Collyer and John H. Mears took off from New York in a Fairchild cabin monoplane (Pratt & Whitney 400 h.p. Wasp engine) on an attempt to break the time record on a trip around the world, using steamship and airplane.

JULY

3rd-5th—(Italy). Capt. Arturo Ferrarin and Maj. Carlo del Prete, flying a Savoia-Marchetti S-64 with a Fiat 550 h.p. engine, established a world's airline distance record of 4,466 miles. They flew from Rome, Italy, to Rouros, Brazil.

5th-7th—(Germany). Johann Risztics and Whilhelm Zimmerman, flying a Junkers W-33 with a Junkers LV 280 h.p. engine, established a world's duration record of 65 hours and 25 minutes. (Dessau)

11th—(Czechoslovakia). Joseph Hermansky and Francois Machacek, flying an Avia BH-9 with a Walter 60 h.p. engine, established a world's closed circuit distance record of 932 miles for light airplanes weighing (empty) less than 881 pounds.

11th-12th—Lt. A. W. Gorton and Chief Btswn. E. E. Reber, U.S.N., flying a PN-12 with 2 Pratt & Whitney 525 h.p. engines, established a world's distance record of 1,336 miles and a speed record of 81 m.p.h. for seaplanes with a useful load of 2204 pounds, returning to point of departure. (Philadelphia, Pa.)

13th—Capt. Emilio Carranza left Roosevelt Field, L. I., N. Y., with the intention of flying non-stop to Mexico City. In attempting to land in New Jersey during a severe storm, his plane struck some trees and he was killed.

13th—(Czechoslovakia). Madame Maryse Bastie and Maurice Drouhin, flying a Caudron 109 with a Salmson 40 h.p. engine, established a world's airline distance record of 657.4 miles for light airplanes weighing (empty) less than 881 pounds. They flew from Le Bourget, Paris, to Treptow.

22nd—Collyer and Mears arrived in New York, having completed their trip around the world in record time (23 days, 15 hours and 8 seconds).

22nd—(France). Lieut. Paris, flying the C.A.M S. 54-G.R. seaplane, *Frigate*, took off from Brest on a proposed flight to America. The flight was discontinued at the Azores.

27th—(England). Capt. G. De Havilland and Mrs. De Havilland, flying a DH Moth 60G with a DH Gipsy 85 h.p. engine,



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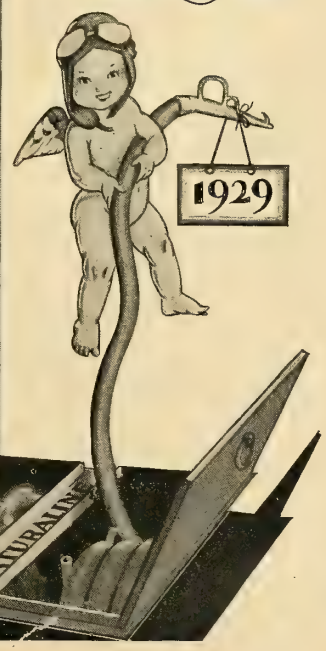
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established an altitude record of 19,862 feet for light airplanes weighing (empty) less than 881 pounds.

29th—Peter Hesselbach remained aloft in his glider, *Darmstadt,* for 4 hours and 5 minutes, thus establishing an American glider record. (Corn Hill, Cape God, Mass.)

AUGUST

1st—The new U. S. air mail rate of 5 cents for the first half ounce became effective.

1st—(Azores). Capt. Frank T. Courtney, accompanied by Fred Pierce, Hugh C. Gilmour and E. B. Hosmer, took off from Porto Tim, Azores, in his Dornier-Napier flying boat in an attempt to fly to America. He had flown to the Azores June 9 from Lisbon. They were forced to alight on the ocean because of engine trouble and were picked up in mid-ocean the next day by the liner *Minnewaska,* in response to radio signals.

3rd—(France). Majors Louis Idzikowski and Kasimir Kubala, of Poland, made an attempt to fly from Le Bourget Field, Paris, to America. They flew in the Amiot biplane, *Marszelak Pilsudski.* They were picked up at sea August 5th by the German steamer *Samos.*

13th—(France). The first successful ship-to-shore flight on scheduled air mail service was made by a Liore-Olivier flying boat with a Gnome-Rhone-Jupiter 420 h.p. engine. The plane, which was catapulted from the French liner *Ile de France,* 450 miles from New York, was piloted by Lieut. Demougeot of the French navy.

16th-17th—(England). Capt. H. S. Broad, flying a Gipsy-Moth, made an endurance record of 24 hours for light airplanes. This was not an official record.

16th—Bert R. J. Hassell and Parker D. Cramer took off in a Stinson-Detroiter at Rockford, Ill., on a flight to Sweden. They were subsequently forced down in Greenland by lack of fuel, and after a long trek across the ice. were rescued on September 2nd by members of the Michigan University Expedition in Greenland.

20th—Art Goebel, pilot, and Harry J. Tucker, passenger, took off from Los Angeles, Cal., in the Lockheed Vega plane, *Yankee Doodle,* on a non-stop flight across the continent.

21st—Goebel and Tucker arrived at Curtiss Field, L. I., N. Y., having completed their non-stop flight from Los Angeles in 18 hours and 58 minutes.

SEPTEMBER

2nd—(France). M. Maurice Finat, flying a Caudron C.109 with a 40 h.p. Salmson engine, established a duration record of 24 hours and 36 minutes for light airplanes.

2nd—(India). Capt. C. D. Barnard and Flying-Officer E. H. Alliott, flying a Fokker monoplane with a Jupiter engine, took off at Karachi on a flight to England. They accomplished the flight in 4½ days, landing at Croydon aerodrome, London, on September 6th.

5th—The French Government established a separate Ministry of Aviation and appointed M. Laurent Eynac as minister.

5th—(Portugal). Three officers of the Portuguese Army Air Service, Capt. Ramos, Lt. Viegas and Lt. Esteves, flying two Vickers Valparaiso biplanes each with a Napier Lion engine, took off from Lisbon on a flight to Portuguese East Africa. They landed at their destination, Beira, on October 20.

5th—Class A transcontinental air race to Los Angeles, Calif., started from Roosevelt Field, L. I., N. Y. The race was won by Earl Rowland, who flew a Cessna monoplane with a Warner Scarab engine.

8th—Classes B and C in the transcontinental races started from Roosevelt Field. Class B race was won by John Livingston, who flew a Waco, and Class C was won by Robert W. Cantwell in a Lockheed Vega.

8th-16th—The National Air Races and Exposition were held at Mines Field, Los Angeles, Cal. An average of 28,000 people attended daily.

10th-11th—(Australia). Squadron-Leader Kingsford-Smith and Flight-Commander Ulm, flying the Fokker trimotor, *Southern Cross,* successfully crossed the Tasman Sea from Sidney, Australia, to Christchurch, New Zealand.

12th—The transcontinental non-stop race to Los Angeles started from Roosevelt Field. None of the six entries completed the flight non-stop.

15th—(Singapore). Four R.A.F. Supermarine Napier "Southampton" flying boats, each with 2 Napier Lion engines, reached Singapore, having flown 25,000 miles from England to Australia and Singapore. The flight began at Felixstowe, England, October 14, 1927.

18th—(South Africa). Col. Sir Pierre van Ryneveld, pilot, and General A. J. Brink, passenger, flying a DH-9 with a 450 h.p. Jupiter engine, made a non-stop flight from Pretoria to Cape Town in 7 hours and 25 minutes.

18th—Juan de la Cierva flew his autogiro from London to Paris.

18th—(Germany). The Swedish pilot, Lindner, with Baron von Huenefeld as passenger, took off at Berlin on a flight to Tokio. They flew in a Junkers W33 with a Junkers L-5 engine and arrived at Tokio on October 18.

22nd—Capt. Sir George Hubert Wilkins with Ben Eielson, pilot, Joseph Crossan, relief pilot, William Gaston and Orval Porter, mechanics, sailed from New York en route to Graham Land, for their Antarctic air expedition.

OCTOBER

4th-5th—The First Aeronautical Safety Conference was held in New York City.

8th-28th—(Germany). The International Aeronautical Exposition was held in Berlin.

10th—The last contingent of Commander Richard E. Byrd's Antarctic expedition sailed aboard the *Larsen* from San Pedro harbor, Calif.

11th—(Germany)—The German dirigible, *Graf Zeppelin,* started from Friedrichshafen on a flight across the Atlantic. The airship carried twenty passengers and a crew of forty. She is powered with five Maybach V.L.2 engines.

15th—The *Graf Zeppelin* arrived at Lakehurst, N. J., having completed the flight across the Atlantic in 111½ hours.

17th—(Newfoundland). Lieut. Com. H. C. MacDonald, flying a DH Moth with a Gipsy engine, took off from Harbor Grace, on a flight across the Atlantic. He has been given up as lost.

24th—Capt. C. B. D. Collyer, pilot, and Harry J. Tucker, passenger, took off in the Lockheed Vega, *Yankee Doodle,* on a non-stop transcontinental flight (Roosevelt Field, L. I., N. Y.)

25th—Collyer and Tucker completed their record transcontinental flight at Los Angeles, having flown across in 24 hours and 51 minutes.

29th—The *Graf Zeppelin* left Lakehurst, N. J., on its return flight across the Atlantic to Friedrichshafen, Germany.

NOVEMBER

1st—(Germany). The *Graf Zeppelin* arrived at its hangar at Friedrichshafen, having completed its return trip across the Atlantic in 71 hours.

4th—(England). Lieut. D'arcy Greig, in a Supermarine-Napier S-5 monoplane flew at a speed of 319.57 miles per hour. This was not an official record, because it did not exceed the former high speed record (318.624 made by de Bernardi) by 5 miles per hour.

5th—(Australia). Capt. Frank Hurley and Flying-Officer Moir took off from Wyndham, Northern Territory, on a 23,000-mile flight to England and return.

8th—The second Gordon Bennett trophy was presented to the Army Air Corps for permanent possession in the United States, as the result of the third successive victory of American balloonists. (Washington, D. C.)

DECEMBER

1st-9th—The First International Aeronautical Exposition will be held in Chicago, Ill.

12-14th—The International Civil Aeronautics Conference will be held in Washington, D. C.

16th—Lieut. James E. Dyer, U.S.N., will be presented with the Herbert Schiff Memorial Trophy which was awarded to him for having flown 1,215 hours without accident for the year ending June 30, the highest number among naval aviators.

17th—Twenty-fifth anniversary of the Wright brothers' flight of the first man-carrying heavier-than-air machine.





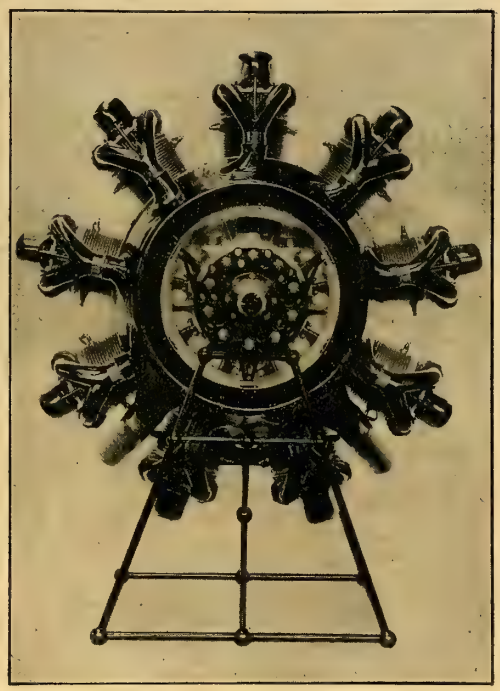




European Air Lines, whose posters are reproduced in this border, are equipped with the "Jupiter" radial air-cooled motor.

At The

CHICAGO SHOW



"BLISS-JUPITER"

Geared & Ungeared Aero Engines

The most thoroughly proved Air Cooled Engine

E.W. BLISS COMPANY

Brooklyn, N. Y., U. S. A.

Sole American Licensees of the Bristol Aeroplane Co., Ltd., England, and the Only Manufacturers of "Jupiter" Aero Engines in the United States of America

















WACO typifies the amazing strides

SEE *the complete display of* WACOS *at the Chicago Show, December 1st to 9th*

* * *

Look back to the Wright Brothers' assemblage of bamboo, piano wire and silk . . . its elevator fore and rudder aft . . . with complicated controls, and heavy motor turning twin propellers behind. Yet it flew at Kitty Hawk in December twenty-five years ago.

Today . . . what a difference between the "flying machine" of 1903 and a WACO! From minutes of hazardous hops to hours of safe air travel. From frail craft to trustworthy WACOS which fly millions of miles every season throughout the year.

Examine a WACO at the Chicago Show, December 1st to 9th. You'll see factors of safety in construction surpassed by no commercial plane at any price.

Go over a WACO part for part, from nose to tail. Check its sturdy motor mounting . . . its perfect streamline and minimum head resistance . . . its clean-cut design, giving lightness with strength and grace with stability in flight.

Consider these other typical WACO values: wireless, tube-braced fuselage; four narrow chord ailerons operated without

THE ADVANCE AIRCRAFT COMPANY, Troy, Ohio

WACO AIRPLANES

MANUFACTURED BY ADVANCE AIRCRAFT CO., TROY, OHIO



in aircraft development since 1903

wires or pulleys; steel elevators controlled without wires or exposed horns; stabilizer adjustable in flight; split-type landing gear hinged directly to the fuselage without a super-structure; rubberless shock absorbing mechanism with only two moving parts not structural members; pressed steel cowling, large cockpits, dual controls. Bendix brakes if desired.

What does all this mean? Simply that transport or pleasure flying in WACO commercial planes is *safe*! That WACO operation is *profitable!* That WACO performance is *consistently superior* . . . and has been for more than *seven years*!

These facts explain why WACO production is far ahead of all others . . . why WACO prices are surprisingly low . . . why more WACOS dot the sky than any other make of aircraft used for commercial or pleasure flying.

Arrange to fly a WACO if you've never done so. Judge its performance in the air . . . its ability to take off and land safely in the smallest fields. WACOS are powered with OX-5, Siemens-Halske, Hisso or Whirlwind motors, Department of Commerce Type Certificates 9, 13, 26, 41, 42. Reasonably prompt deliveries. Write for WACO Catalog A-12.

THE ADVANCE AIRCRAFT COMPANY, Troy, Ohio

WACO AIRPLANES
MANUFACTURED BY ADVANCE AIRCRAFT CO., TROY, OHIO

TECHNICAL

THE TWENTY-PASSENGER KEYSTONE PATRICIAN

1575 h.p. CABIN MONOPLANE



THE new twenty-passenger Patrician is the most recent design of the Keystone Aircraft Corporation of Bristol, Pa. The Patrician is a cabin monoplane for commercial transport service, powered with three Wright Cyclone engines of 525 horsepower each.

The main cabin is six feet square in cross section and nineteen feet, six inches long. Eighteen chairs are arranged three abreast in six rows, with an aisle running lengthwise. Ample headroom is provided, so that passengers can move about easily. The chairs are upholstered, and roomy.

Light in the cabin is admitted through a set of continuous glass panels. Visibility below is virtually unobstructed. The single wing above shuts off the direct rays of the sun from the cabin.

Dome and wall lights are furnished for night flights. Racks have been provided for personal belongings above each set of seats. The walls are heavily insulated with a sound-proof material which muffles the noise of motors. Large entrance doors are located at the rear of the cabin on each side of the plane. An exit through the top of the cabin is available in case of an emergency.

A set of instruments is installed in the cabin, so that passengers can tell the altitude, speed, etc., at all times. A radio equipped with loud speaker may be installed in the cabin, over which programs from ground stations may be received. An arrangement is provided by which the comments of the pilot as to location, scenery below, or announcement of maneuvers about to be made are heard in the cabin through the loud speaker. A sending set may be installed, to permit communication with distant stations and make it possible for the pilot to check up on weather conditions along the course.

Optional equipment includes a sleeping compartment and buffet facilities. A standard sized berth may be installed in a private room, which is equipped with running water and toilet facilities. For the buffet Keystone has designed a refrigerator.

Pilot's cockpit is reached through a door at the forward end of the main cabin. The pilot's seat is on the right, and a folding seat for the assistant pilot, next to it on the left. The installation of two sets of adjustable rubber pedals, together with a throw arrangement fitted on the control column, permits control from either seat. A full set of instruments is provided, arranged on an indirectly lighted instrument board. Individual brakes installed on each wheel are operated through attachments which are integral with the rubber pedals. The pilot's position is several feet forward of the wing, affording good vision forward, on either side, above and behind.

The Patrician is of metal construction, fabric covered. Fuselage, wing spars and tail surfaces are of chrome molybdenum steel tubing with welded joints throughout. Ribs are of aluminum alloy riveted in the form of a stiff truss.

The ship will maintain flight with any one of the three engines cut out, and will maintain a flat glide on a single engine, permitting an emergency landing to be made in safety. The individual motor mounts are detachable and motors are readily accessible for servicing.

The landing gear is of the Oleo strut

(*Continued on next page*)



The Keystone Patrician which was first test flown at Bristol, Pa., during the early part of November.



Sinbad the Sailor, in the Arabian Nights tale, was forced to carry the Old Man of the Sea upon his shoulders.

AVIATION, FREE FROM ITS HANDICAP OF NEEDLESS WEIGHT, GOES ON TO GREATER THINGS

Like the creature that fastened itself upon Sinbad's shoulders and did not leave him even during sleep, needless weight has been a ceaseless drag on aviation progress.

But, as Sinbad finally threw off his burden, so, too, has aviation been freed.

With the coming of Aluminum and its alloys into plane construction, designers have begun to vision ultimate ratios of plane weights to horsepower never before thought possible.

Nor are their ideas about Aluminum and its alloys restricted to weight-saving alone.

Strength and safety are also involved. Aluminum alloys are taking the place not only of far heavier steel and cast iron, but of fragile and inflammable wood as well.

The use of Aluminum and its alloys in aircraft construction has not come about suddenly, or through the labors of any one man or group of men.

Here and abroad, plane designers, aviators, factory men, metallurgists, have each contributed to the solution of the problem.

But Aluminum Company of America may surely add that it is today not only a well recognized and reliable source of supply for airplane Aluminum in pure, alloyed and fabricated forms, but also that recognized authority on its use, to which plane designers turn confidently for information and service.

ALUMINUM COMPANY OF AMERICA
2484 Oliver Building, Pittsburgh, Pa.
Aluminum in Every Commercial Form Offices in 19 Principal American Cities

ALUMINUM AND ITS ALLOYS *for Aircraft*



In developing those qualities of aluminum favorable to its use in aircraft and in correcting and eliminating those which are detrimental, the metallurgical and engineering staff of Aluminum Company of America gave to the advancement of aluminum in aircraft the Alclad Aluminum Alloys.

Alclad sheet consists of a strong alloy base with a thin inseparable protective coating of pure non-corrodible aluminum. Thin sheets of strong alloys are thus protected against the corrosive action of the elements and given greatly extended life.

This protection is proving invaluable for such aircraft parts as wing ribs and beams, false spars, leading and trailing edges, cowling and cowling supports, hull frames and sheathings, decking, battery boxes, support straps, channels, walkways, angles and braces.

Complete technical data concerning the Company's Alclad alloys, and on every phase of the use of aluminum in plane and motor construction, is available and at the service of every plane designer and manufacturer.

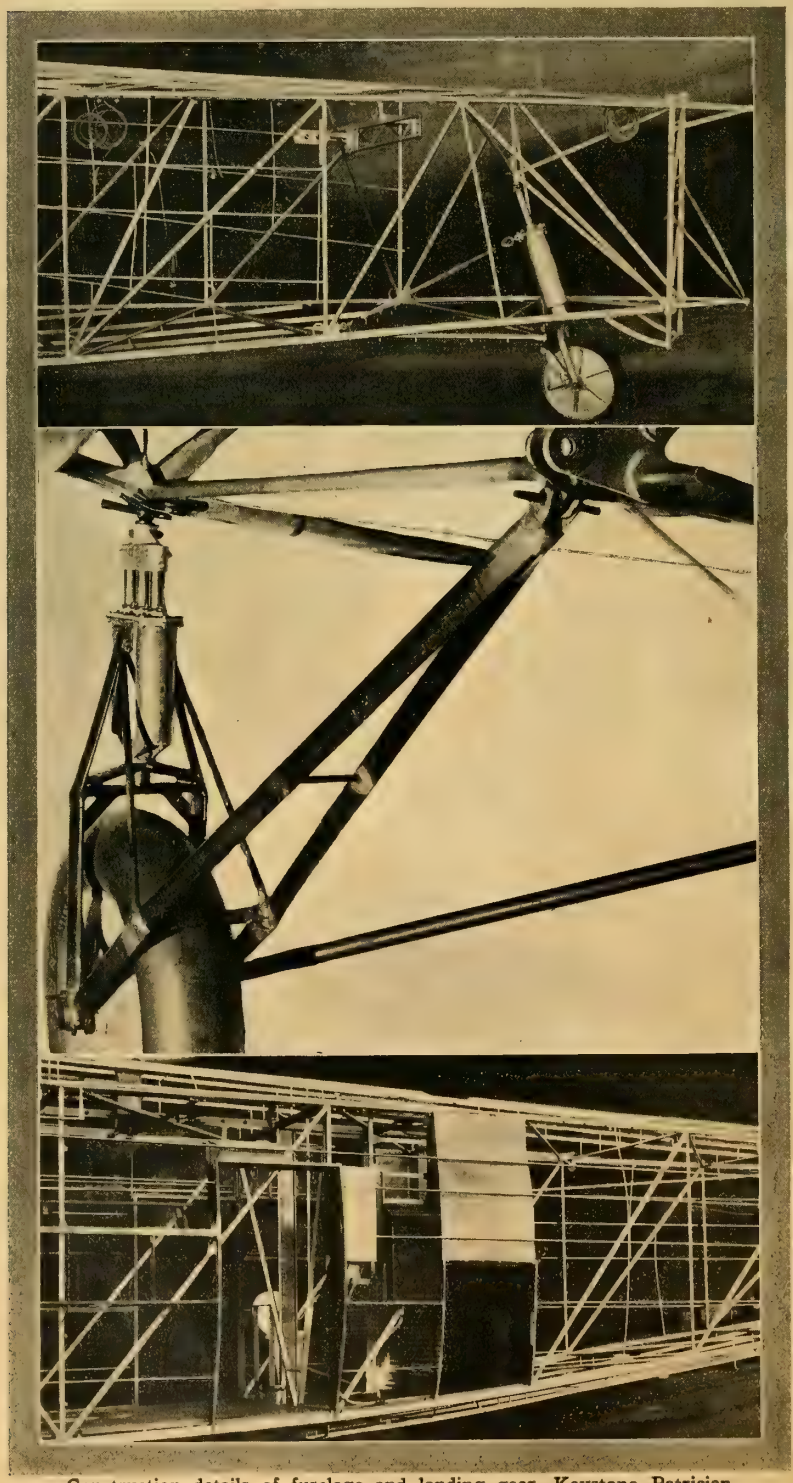
ALUMINUM

(*Continued from preceding page*)
type, utilizing a combination of heavy steel springs and oil in an enclosed cylinder block.

Heavy ribbed aluminum fuel tanks, having a total capacity of 500 gallons, are located in the center section of the wing. Gasoline flows by gravity to the engines. Main, auxiliary, and reserve tanks are provided, having individual shut-off cocks and selective fuel lines to each engine.

Specifications

Span of wing	90 feet
Area of wing	1,000 square feet
Length overall	63 feet
Height	13 feet
Fuel (4½ hours cruising)	2,295 pounds
Crew (two)	320 pounds
Passengers (eighteen)	2,880 pounds
Baggage	1,000 pounds
Pay load	3,880 pounds
Total weight	15,000 pounds
High speed	155 miles per hour
Cruising speed	130 miles per hour
Stalling speed	59 miles per hour
Ceiling	16,100 feet
Climb at sea level	1,150 feet per minute
Endurance at cruising speed	6 hours



Construction details of fuselage and landing gear, Keystone Patrician.

TOWLE AMPHIBIAN

TEST flights conducted by Lieut. George R. Pond, U. S. Navy (Fleet Reserve) have been in progress on the Detroit River between Grayhaven and Grosse Ile Airport, on a new type of amphibian metal flying boat, designed to carry four passengers, pilot and baggage. The plane was designed and built to the specifications of H. G. McCarroll, former Secretary of the Detroit Board of Commerce, Aviation Committee, and Lieut. Pond, by a group of young engineers from the University of Detroit, under the supervision of Tom Towle, including; Carleton Wolfe, Ralph Johnson and William Perfield. Towle formerly was an engineer with the Airplane Division of the Ford Motor Co.

Several endurance and distance flights are in contemplation during the ensuing months by Lieut. Pond and McCarroll, during which time further refinements will be made, as is necessary in any newly designed aircraft. The objective is to develop a fool-proof land and water plane which will possess maximum safety. The amphibian will be able to sustain flight on either of two engines and requires a minimum space to land on lakes, rivers or fields.

This first ship has been fitted with large tanks for an endurance test range of 2,000 miles and with high safety features in structural strength to permit competing with several present world records for craft of this type.

It is intended that the commercial seating installation shall be for from three to five passengers and pilot, plus baggage and four hours of fuel. The airplane is powered with two 150 h.p. Comet engines. This engine was chosen because of the fact that it was developed for heavy duty commercial work.

The tail surfaces are attached directly to the hull and pivoted at the front for stabilizer adjustment. The pontoons are of the same type of construction as that of the hull.

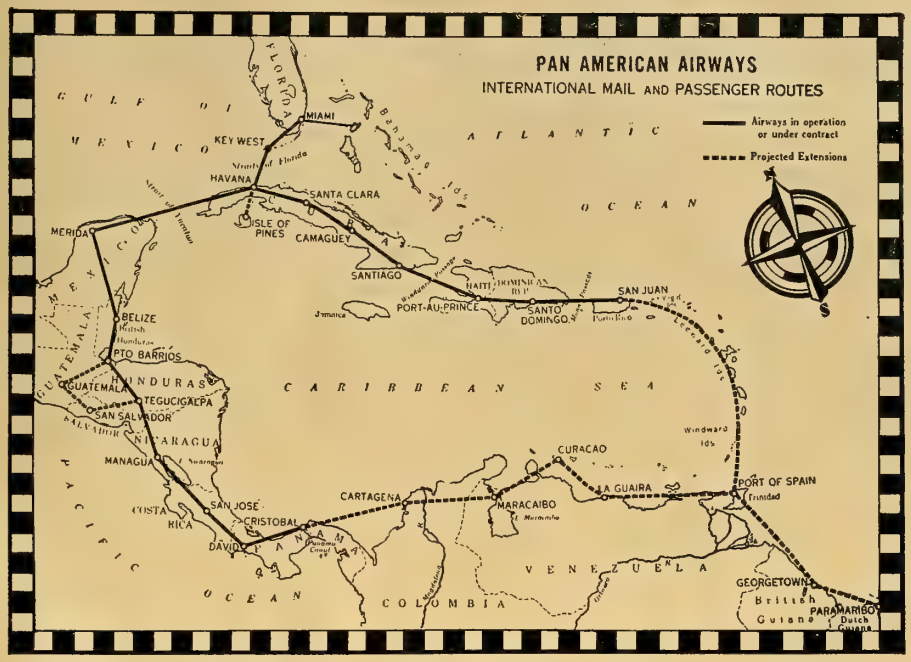
The wing is of the continuous plywood box spar type, supported and attached to the hull by streamline steel tubing. The center section struts are joined to the wings directly under the engine mounts.

The engine mounts are of the conventional steel tubing. They not only support the engine, but likewise a forty-five gallon gravity tank at the rear of each.

The ship's accessories consist mainly of Westinghouse Micarta Propellers, Pioneer Instruments, Bendix Wheels, United States Tires and Heywood Starters.

Characteristics

Span	52 feet
Length	35 feet
Height	14 feet
Top speed	115 m.p.h.
Service ceiling	14,000 feet
Landing speed	51 m.p.h.



Aviation Corporation *of the* Americas

Sole Owners of all the Outstanding Capital Stock of

PAA

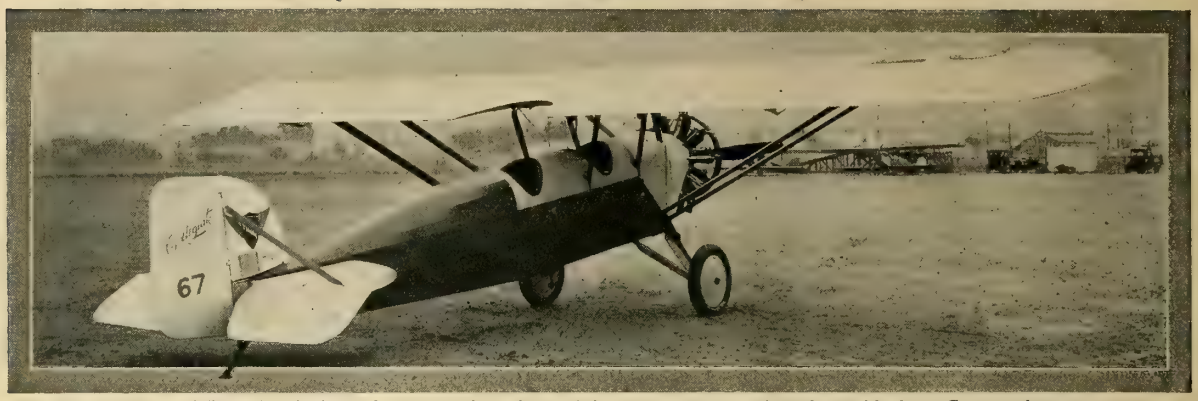
Pan American Airways, Inc.

Its operating company

On routes made possible by foreign air mail contracts awarded by the United States Post Office Department, this company will operate an air mail and passenger transport system 4233 miles in length, linking the United States, the Bahamas, Cuba, Haiti, the Dominican Republic, Porto Rico, Yucatan, British Honduras, Honduras, Nicaragua, Costa Rica, Panama and the Panama Canal Zone.

By operating arrangements with Atlantic Coast Line Railroad and Florida East Coast Railway through rail-air passenger service is made available from any point in the United States to any point on the operating route. Train-to-plane transfers at Pan American Airway's terminal in Miami, Florida.

100 EAST 42nd STREET, NEW YORK CITY



The "Collegiate" high wing monoplane for training, produced by the Timm Airplane Corporation.

THE "COLLEGIATE" MONOPLANE

THE "Collegiate", built by the Timm Airplane Corp., Glendale, Calif., is the result of years of experience in airplane design, construction and operation. It was designed to meet the demand for a practical, high quality training plane. It is, however, ideal as a sport plane.

Safety and comfort for the pilot were the first considerations. Among the many other principal points that were carefully considered are the safety factor, durability, economy of operation, repair and replacement of parts, minimum work in servicing, etc.

Jigs, patterns, etc. have been made to manufacture the "Collegiate" in large quantities, thus assuring accurate workmanship and uniform construction.

It is designed in accordance with Army requirements but with a safety factor of 10 instead of the required 8½. All of the materials are of Army specification. Fittings and bolts are chromium plated.

The fuselage is constructed entirely of chrome molybdenum tubing. The motor mounting is detachable. Removable dual controls are standard equipment. The seats are well upholstered and have deep leather covered spring cushion. New small type Pioneer instruments, i. e., altimeter, tachometer, oil pressure and oil temperature gauges, are used.

The landing gear, of the hydraulic type with divided axles, is equipped with 30 x 5 wheels. The tread is 7½ feet. The tail skid with its rubber shock absorber may be removed as a unit. The skid shoe is surfaced with "Stoodite" for long service.

The tail surfaces are constructed of chrome tubing. The stabilizer has a large range of adjustment. The elevator horns are inside of the fin. There are two independent sets of control wires and fittings to the elevators and rudder.

The wings are in two sections and are braced with tubular struts. The wing spars are of I section with 5-ply webs and spruce caps. The ribs are a combination truss and web construction. The two fuel tanks are mounted in the wings. The ailerons are unusually long and narrow, are very effective, and are easy to operate. They are constructed of plywood and fabric covered. Two independent sets of wires and fittings are used in the aileron control system.

The engine is the new type 10-cylinder 120 horsepower Anzani. However, any engine of 80 to 150 horsepower may be installed.

General Specifications

Span	35 feet
Length	24 feet 7 inches
Height	8 feet 5 inches
Wing area	236 square feet
Weight, empty	1,246 pounds
Weight, loaded	1,952 pounds
Speed, maximum	118 miles per hour
Speed, landing	35 miles per hour
Range	500 miles

BARLING DESIGNS NEW PROPELLER

WALTER H. BARLING, chief engineer and designer of the Nicholas-Beazley Airplane Co., Inc., has designed and perfected a highly efficient OX-5 engine propeller to be used on commercial planes by the application of a newly principled combination embodied in a new airfoil design of his own creation.

The propeller is of the conventional wood laminated type construction, being extremely light in weight and flexible. The lumber used is free grained, slowly kiln-dried by hot air. Laminations are made with a hot process glue.

In his particular adaptation of one of the infinite number of combinatons of thickness, size and angle it is possible to employ in designing propellers, Mr. Barling has achieved an airfoil section that possesses unusual efficiency. Take-off, climb and top speed comparisons have been made on OX-5 biplanes and the Barling design is said to give a quicker take-off by three seconds, a slightly higher speed and a faster rate of climb at less revolutions than when ordinary propellers are used.

The blades are thin and wide with a pronounced angle and camber, the latter being "carried through" from hub to tip in an unconventional manner, giving a highly efficient, distributed "throw" on the entire length.

Differences between the popular propellers and the Barling type in appearance are evident only in the width of the blades and the apparent forward curved tips.

Nicholas-Beazley is contemplating production in the near future on this type in styles for various engines and planes.

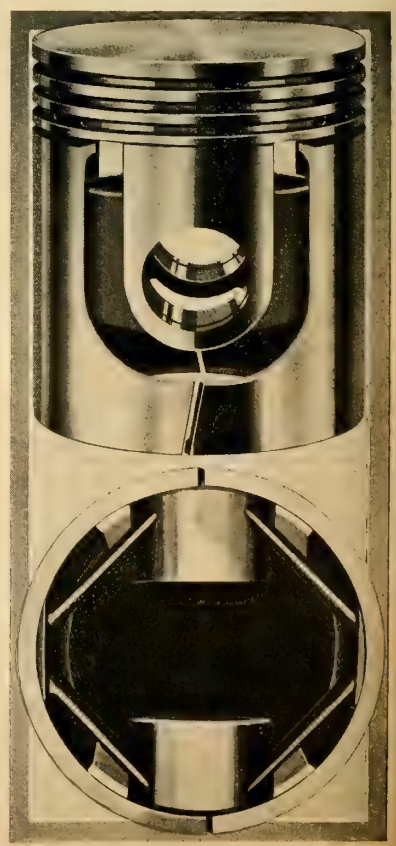
RAY DAY PISTON FOR AIRCRAFT ENGINES

ANNOUNCEMENT is being made by the Ray Day Piston Company, manufacturers of aluminum alloy pistons, of a new type and design of piston especially adapted to the needs of aircraft engines.

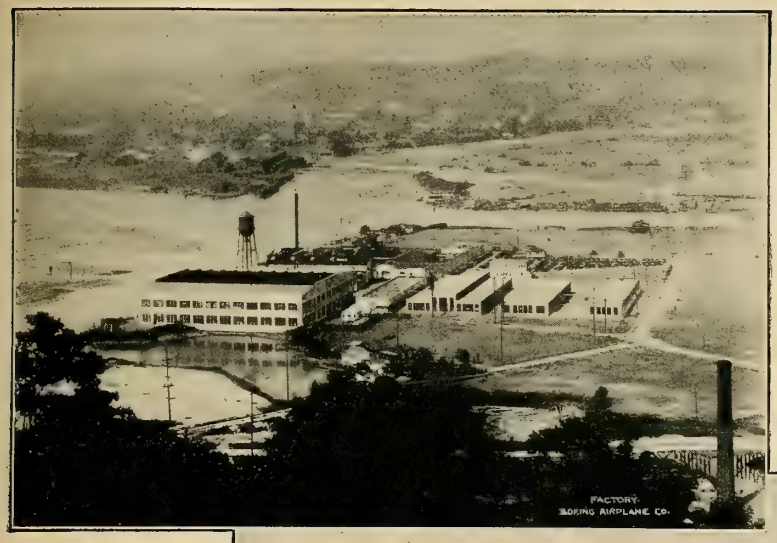
Replacement pistons will be manufactured for such engines as the Liberty and OX series.

The outstanding feature of the one-piece

(*Continued on next page*)



Views of the Ray Day piston.



BOEING



The largest passenger transport now in production in the U. S. A.

Eight new Boeing planes, like the one shown here, 12 passenger, 3 engine transports, will soon be added to the equipment of the air mail line between Chicago and San Francisco.

It is significant that Udylite is used in rust proofing the ferrous metal parts of all Boeing planes.

Udylite Service Plants are established in all the principal cities to serve manufacturers of steel or iron products. Some manufacturers may prefer to apply the Udylite Process in their own plants—full information will be given them, upon request.

Udylite
RUST PROOFS
REG. U S PAT OFF.

THE UDYLITE PROCESS COMPANY *Detroit, Mich.*
3220 BELLEVUE AVE.

AFFILIATED WITH THE GENERAL CHROMIUM CORPORATION

(*Continued from preceding page*)
piston is that its skirt expansion can be completely controlled through specific design, making it possible even to obtain a negative skirt expansion with a positive expansion of the head, without distorting the skirt in any manner.

The piston head is cut away from the skirt as in the standard Ray Day piston. Two trusses extend downward from the outer diameter of the head to connect the piston bosses to the head. From each of the pin bosses, ribs, which are part of the piston casting, connect the bosses to the two slipper skirt halves.

When the head expands under heat, the bosses will move outward, ribbing being provided to prevent deflection of the connecting supports. The bosses in turn, through the ribs to the skirt, tend to pull the slipper section inward to offset the normal expansion of the skirt.

The action of the skirt ribs on the separate slipper skirt halves is such as could not produce any appreciable distortion of the skirt, and the full bearing area is maintained. The piston is designed so that the approximate skirt clearance is about .001 inch per inch of bore.

The piston weights of the new Ray Day aircraft piston correspond closely to those of the solid skirt type in use at present in production aircraft engines. The use of four rings per piston is recommended as a minimum to assure low head temperatures, especially with air-cooled engines.

A special aluminum alloy is used for the making of this piston. It is close-grained, extremely hard and has high conductivity.

AIRPLANE OIL PRESSURE GAUGE

THE basic part of the AC Oil Gauge is the Bourdon tube. This is a hollow curved metallic tube which changes its shape with pressure. The movement of the tube is transmitted to the pointer which indicates in terms of pressure on the face of the instrument. The Bourdon tube principle was selected for the AC Oil Gauge because of its reliability and because it is generally accepted as the standard means of pressure measurement.

NEW SERIES WHIRLWIND ENGINES

ANNOUNCEMENT was made recently of three new series Whirlwind engines now ready for production by the Wright Aeronautical Corporation. This series of which illustrations are presented to the public for the first time through AERO DIGEST, consists of five-, seven- and nine-cylinder types rated at 150, 225 and 300 horsepower respectively. Deliveries on the 300 horsepower engine will probably begin about January 1, while production of the 150 horsepower model is expected to begin in February and that of the 225 horsepower model in May. Like the well known J-5 Whirlwind, they are of the fixed radial air-cooled type operating on the 4-stroke Otto cycle on domestic aviation gasoline. Differing only in respect to the camshaft and number of cylinders, the three models have such interchangeable parts as cylinders, pistons, connecting rods and crankshaft.

The brake horsepowers given here and indicated on the accompanying graphs are obtained in air at 60 degrees Fahrenheit and 29.92 inches barometer. In each of the three models the maximum fuel consumption is .55 pounds per brake horsepower per hour at rated power and speed. Maximum oil consumption is .035 pounds per b.h.p. per hour at rated power.

Model	*cylinders*	*rated power*	*r.p.m.*	*weight dry*
R-540	five	150 h.p.	1,800	370 pounds
R-760	seven	225 h.p.	2,000	425 pounds
R-975	nine	300 h.p.	2,000	485 pounds

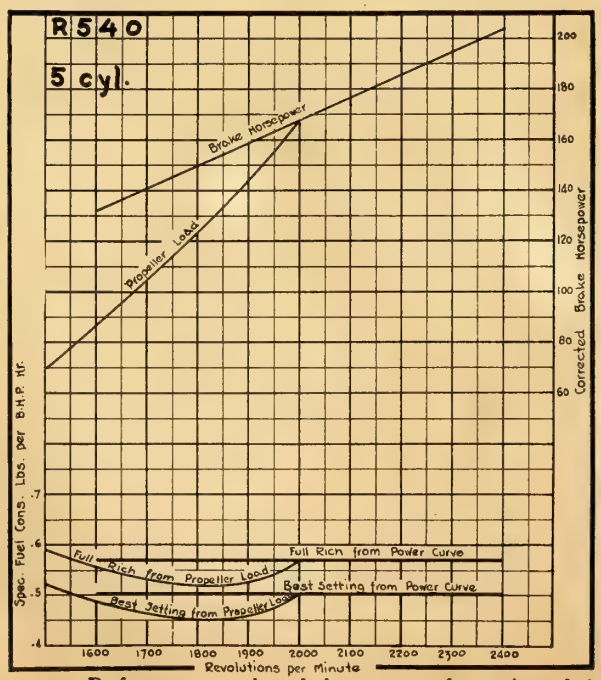
The above weights do not include starter, starting magneto, fuel pump or propeller hub. They do include carburetor, complete ignition system with dual Scintilla magnetos, magneto advance and retard mechanism, and oil pump.

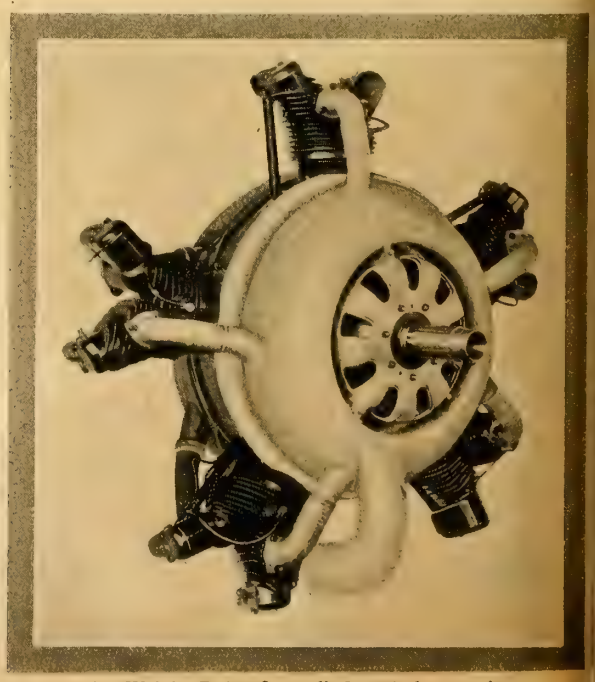
Cylinders have a bore of 5 inches, and the pistons have a stroke of 5½ inches, giving a compression ratio of 5.1 to 1. The total piston displacements of the three models are as follows: 5-cylinder, 540 cubic inches; 7-cylinder, 756 cubic inches; 9-cylinder, 975 cubic inches.

Each engine is submitted to an acceptance test as follows: running in until ready for preliminary test. The preliminary test consists of two hours at 9/10 rated power. After this test the engine is dissembled for inspection and such corrections made as may be necessary. The engine is then reassembled and submitted to a final acceptance test consisting of ½ hour at 9/10 rated power and ½ hour at full rated power. During the last ½ hour of this test, readings of power, fuel and oil consumption are made to demonstrate that the engine meets the guaranteed performance.

Being 15 pounds lighter than its predecessor, the Whirlwind J-5, the 300 horsepower model is also more efficient. Head

(*Continued on next page*)





Performance graph and three-quarter front view of the new series Wright R-540 five-cylinder 150 h.p. engine.



TRAVEL AIR

The Standard of Aircraft Comparison

Two cabin monoplanes (6 and 4 place); five biplanes with Whirlwind, Challenger, Warner-Scareb, OX5 and Hisso Motors... A complete line of airplanes for training, light commercial and heavy transport.

TRAVEL AIR MANUFACTURING CO.

Chicago Show Exhibit in North Hall Coliseum at Main Entrance

WICHITA, KANSAS

(*Continued from preceding page*)
resistance has been materially reduced by removing valve actuating mechanisms, magnetos, etc., to the rear and using nose cowling, built-in exhaust ring and shutters for regulating the temperature of the oil.

Regular equipment for these engines consists of all necessary parts which form an integral part of the engine assembly, such as carburetor, dual running magnetos, high tension wires, spark plugs, etc. All engines are supplied with ignition switch, tool kit, instruction book, suitable mixture heater with exhaust connections to two cylinders, and domestic shipping box. Standard types of starters, engine-driven fuel pumps, and standard hubs for steel propellers can be furnished with engines at additional cost.

The engine is finished externally in baked enamel, the standard colors being black for the cylinders and blue-grey for the crankcase and other external aluminum parts. Steel parts are not ordinarily enamelled, but exposed steel parts are finished with a suitable non-corrosive coating.

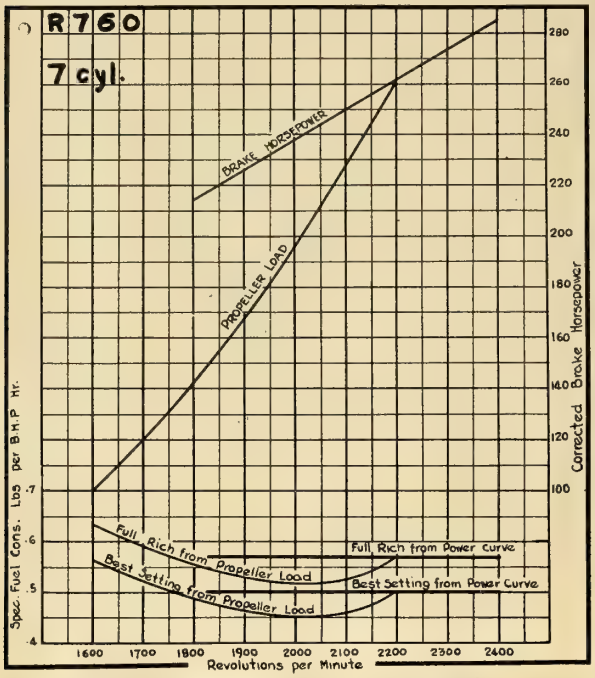
Equipment attached to engine.

Engine-driven fuel pump.....2.5 pounds
Mixture control heater.....6.0 pounds
Eclipse hand inertia starter.....20.0 pounds
Eclipse starter handle .....5.0 pounds
Propeller hub (for 2-blade steel propeller) 20.0 pounds

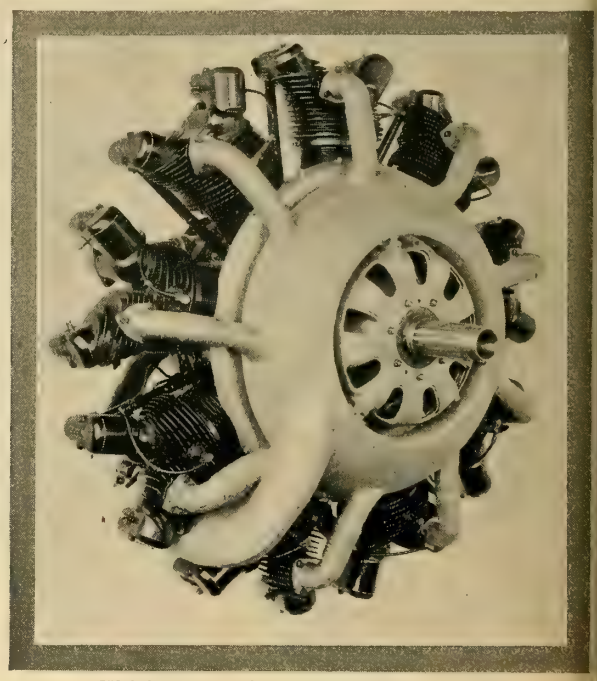
Equipment packed in shipping box.

Lunkenheimer primer ..... .8 pounds
Ignition switch ..... .9 pounds
Tool kit .....23.0 pounds
Instruction book .....1.0 pound

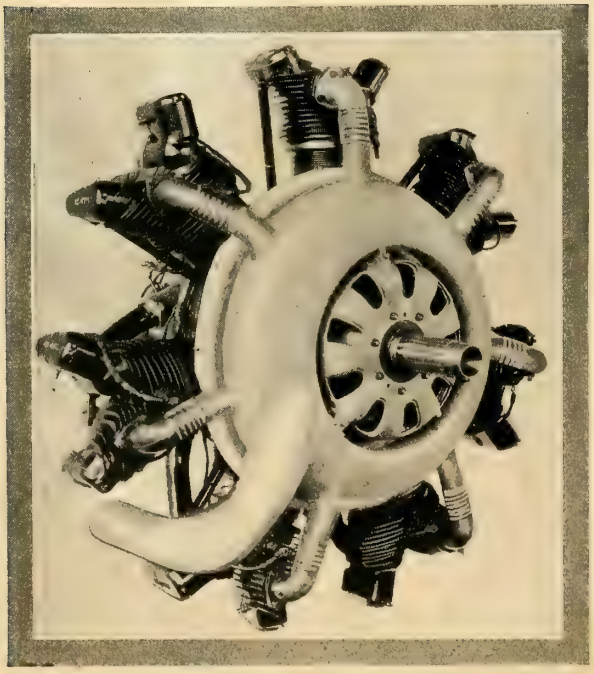
In addition to the above equipment, the engines are supplied with exhaust flanges; the set of 5 flanges weighing 1.35 pounds; 7 flanges, 1.85 pounds; 9 flanges, 2.5 pounds.

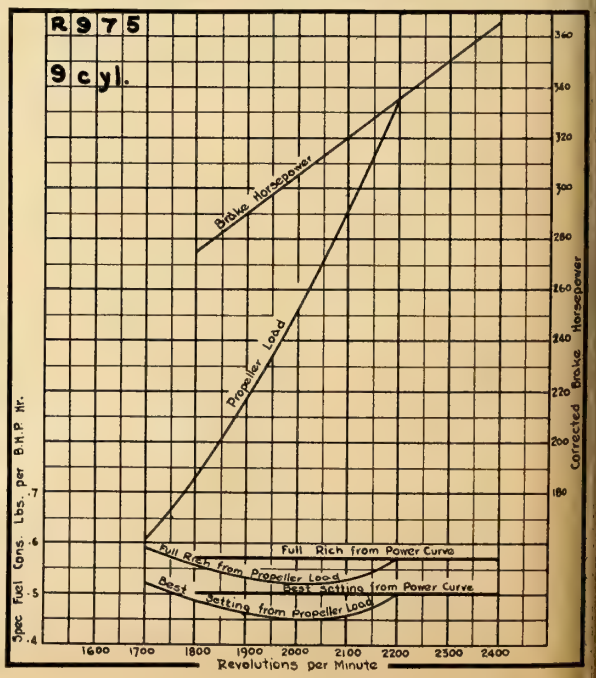


Wright R-760 seven-cylinder 225 h.p. engine.



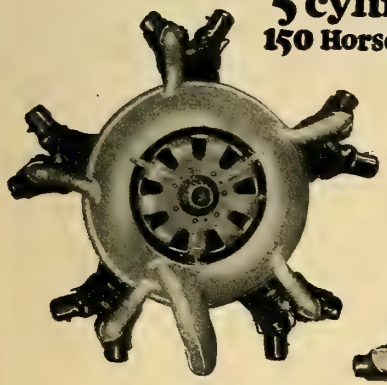
Wright R-975 nine-cylinder 300 h.p. engine.



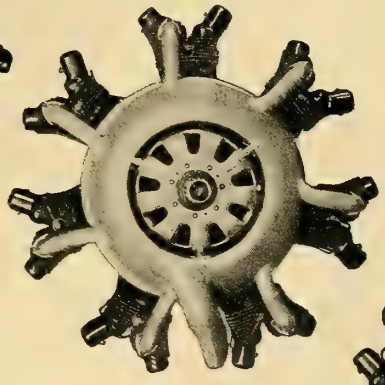


Announcing
The New WHIRLWIND Series
in

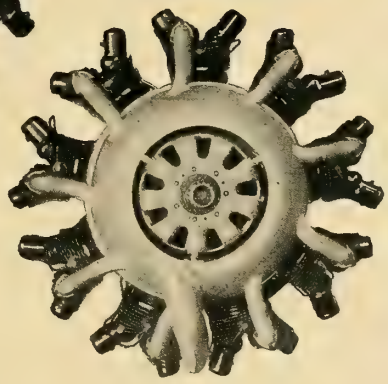
5 cylinder
150 Horsepower



7 cylinder
225 Horsepower



9 cylinder
300 Horsepower



AUTHORIZED PARTS DEALERS

Air Associates Inc.
Curtiss Field, Long Island, N. Y.

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Los Angeles, Cal.

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AERONAUTICAL CHAMBER OF COMMERCE

See the WRIGHT EXHIBIT
Chicago Aero Show
DECEMBER 1st—9th

WRIGHT AERONAUTICAL CORPORATION
Paterson, N. J. *U. S. A.*
CANADIAN WRIGHT LIMITED, Sole Licensees for Canada, Montreal

WRIGHT

BERLINER MONOPLANE



BERLINER Monoplane features include exceptional visibility, easy access to passenger compartment, ease of rigging, inspection and maintenance, interchangeable parts, readily removable radiator and gas tank, improved stabilizer control, and highly efficient hydraulic-spring shock absorber.

Berliner Monoplanes are manufactured by the Berliner Aircraft Co., Inc., of Alexandria, Va., under Department of Commerce approved type certificate No. 39. An ample number of new OX-5 motors are available. The plane is built to take engines up to 220 horsepower.

The plane is carefully designed for hard service as a commercial and training plane, and is ideally appointed for use by the private owner. It has been engineered throughout to minimize inspection and service costs.

The undercarriage is of the split axle type recommended for cross-country work where unprepared fields are numerous. 26 by 4 wire wheels and tires are standard equipment; the wheels are faired with aluminum discs. The wheels have a seven-foot tread.

The ship may be operated from either cockpit; dual control is standard equipment. Air controls are of the conventional joystick variety. Directional control is by means of foot pedals. The elevator control is by means of an alloy steel tube connected directly to the rear control stick and the elevator horn.

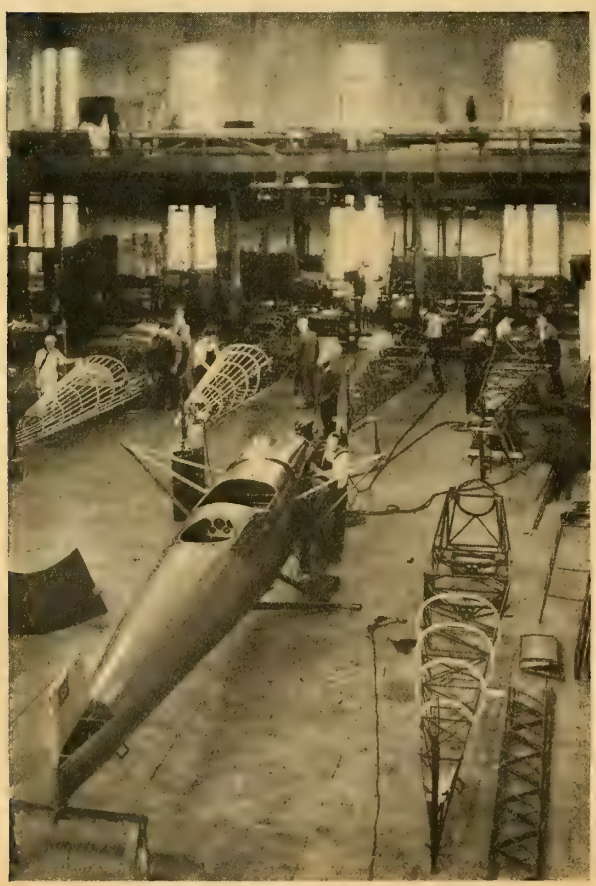
The rudder control cables operate in a direct line from the foot pedals to the rudder horn and are carefully located so as to touch no metal throughout their entire length. The cables are enclosed inside the fuselage and emerge a few inches from the rudder post. These cables are the only ones used.

A complete instrument board in the rear cockpit contains an altimeter, tachometer, air speed meter, oil pressure gauge and temperature gauge. There are all Consolidated instruments. The ignition switch and booster button are also mounted on the board. Directly above the instrument board is mounted a Pioneer magnetic compass. In the pilot's cockpit also are the Pyrene fire extinguisher and a first aid kit. Wide safety belts built to government specifications are fitted in both front and rear cockpit.

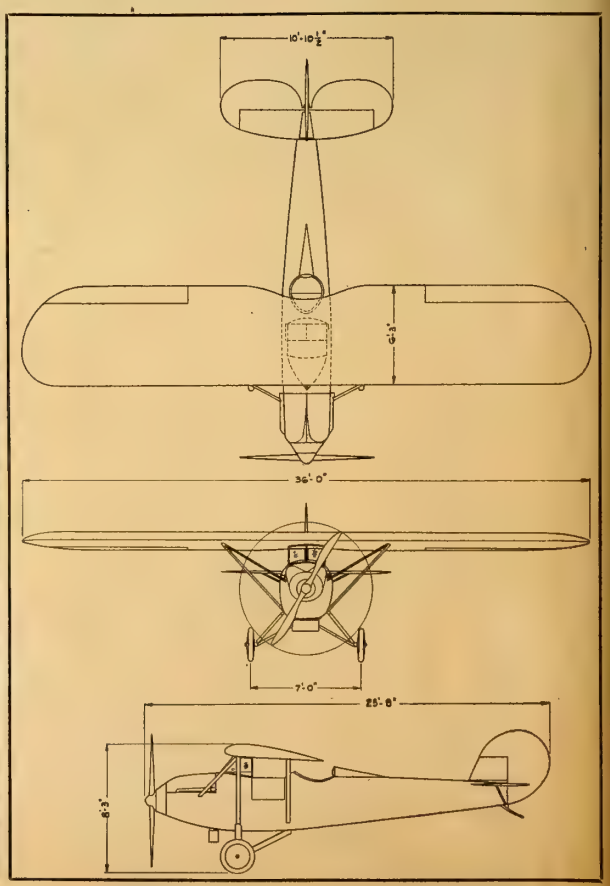
The engine and both cockpits are cowled with heavy sheet aluminum .040 inch thick, rigidly secured to the steel fuselage structure. The cowling and sheet metal work is comparable to present day, custom built, automobile body work. The cowling hinges down the center, making it possible to raise the hood as in a modern automobile. Both cockpits are protected by well upholstered leather crash pads.

The front cockpit is accessible by means of a door on the left side, conveniently located and reached by two aluminum steps. This enables passengers to step to the floor

(*Continued on next page*)



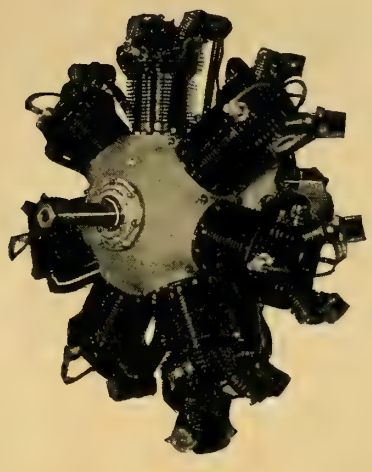
Corner of the Berliner factory at Alexandria.



Outline drawings of the Berliner monoplane.

Scarab

110 H. P.
1850 R. P. M.



The
Warner "Scarab"

WARNER ACHIEVEMENTS!

IN LESS than six months from the time the first "Scarab" engine was produced, the engine has proven itself in the following competitive events.

1. The capture of third place in the National Air Tour, leading all single motor cabin planes, which was accomplished by a Stinson Junior equipped with a Warner "Scarab."
2. Winning of 1st, 2nd, 3rd, and 4th places in the New York-Los Angeles Class "A" Air Derby by — Cessna, American Moth, Travel Air, and the Challenger —all equipped with the Warner "Scarab."
3. Taking 1st, 2nd, and 3rd places in the Class "A" Cincinnati Air Derby by — American Moth, Stinson, and the Challenger — also all equipped with the Warner "Scarab."

Such phenomenal results could be accomplished only by an engine built by an experienced, careful engine building organization guided by experienced leaders in the financial and manufacturing world.

The 1929 series "Scarab" retains all of the qualities of the original engine and has in addition a number of refinements and improvements which add to the performance and reliability, and reduces servicing to a minimum.

THE WARNER AIRCRAFT CORPORATION
Detroit - Michigan
U. S. A.

(*Continued from preceding page*)

of the plane without first stepping on the seat. The passenger cockpit is large and comfortable, being 39 inches in width and offering ample convenience for long trips. It is protected by an efficient windshield which extends up to the wing and affords complete protection to both cockpits. By thus eliminating the need for a separate pilot's windshield, communication between the two cockpits is possible. Steps for the rear cockpit are welded on the side of the fuselage to the steel tubing. Plywood is used for cockpit floorings. Both cockpits are upholstered of leather. The pilot's cockpit is reinforced around the cowling.

The fuselage is of welded chrome molybdenum steel tubing—rigidly trussed and braced. The steel fuselage is streamlined from nose to tail by the use of elliptical cross sections formed of light spruce members, giving a monocoupe appearance, tapering to a vertical edge at the rear. The extreme front ends of the upper longerons, forming the engine mount, are of steel tubing of square cross section and are not detachable. The standard mount is for the OX-5 engine; others are available.

The comparatively short space between the two longerons—14⅛ inches—enables the diagonal members of the truss to be of the same size and also enable the construction of the large cockpit door.

The wing is of full cantilever construction of uniform cross section throughout its span. The airfoil is Göttingen 398. Spars and ribs are built of spruce, as are the compression ribs which are linked at frequent intervals with steel drag wires to take care of the interior drag bracing. The drag wires are placed at both the top and bottom of these spars, thus eliminating torsional weaving and wing flutter. The leading edge is of spruce routed out. The ribs are of bass wood and spruce cap strips. Casein water-proof glue is used exclusively. Hand grips are welded to the steel wing tip and afford an excellent anchorage facility for tying down the ship on a strange field or where no hangar is available.

Wing spars are of spruce of two-piece box type covered with two-ply double diagonal mahogany plywood, with one-half inch spruce bulkheads at five and a quarter inch intervals. Where there are important wing fittings, the spars are solid throughout. The spars taper toward the wing tips. Large depth of spars in conjunction with the double drag bracing affords a rigid structure.

The front wing mountings are two tripod struts made of streamline chrome molybdenum tubing rigidly bolted, without adjustment, to the wing and fuselage. The rear supports are single struts of the same streamline material, bolted to the wing and fuselage and immediately adjustable in length to provide changes in the angle of incidence or for rigging purposes. The wing is easily adjusted. The front drag strut connects to the engine bed.

Frise ailerons are hinged to a false spar at the rear of the main wing section and are operated from the rear cockpit by means of push rods through torque tubes. Their connections are visible at all times. Aileron cables are eliminated, thus assuring direct and positive control. The ailerons themselves are of steel tubing.

The stabilizer may be adjusted over a wide range and to fine adjustments by means of a worm operated from the pilot's cockpit by a duralumin wheel and shaft. The ship possesses remarkable inherent stability, and with this adjustment, can be flown "hands off" for a long period of time.

Tail surfaces have been carefully designed to provide ample area and at the same time to keep down the keight and resistance. Spars, edges and ribs are of welded steel tubing, alloy steel wherever necessary. The rudder post is of steel tubing construction. Control hinges are of the strap type with wide bearing area. The flippers and rudder are balanced. At the junction of the tail surfaces with the longerons, there is an opening covered with an easily removable inspection plate. The size of the opening is sufficient to give visual inspection of the stabilizer and flipper fittings.

The standard monoplane is equipped with the 90 h.p. Curtiss OX-5 engine. Complete dual ignition for this engine can also be furnished, and is recommended. The radiator is underslung below the engine bed, and is easily removed or serviced.

This plane is also available with the 220 h.p. Wright Whirlwind engine. Other engines within this wide power range may be had on special order.

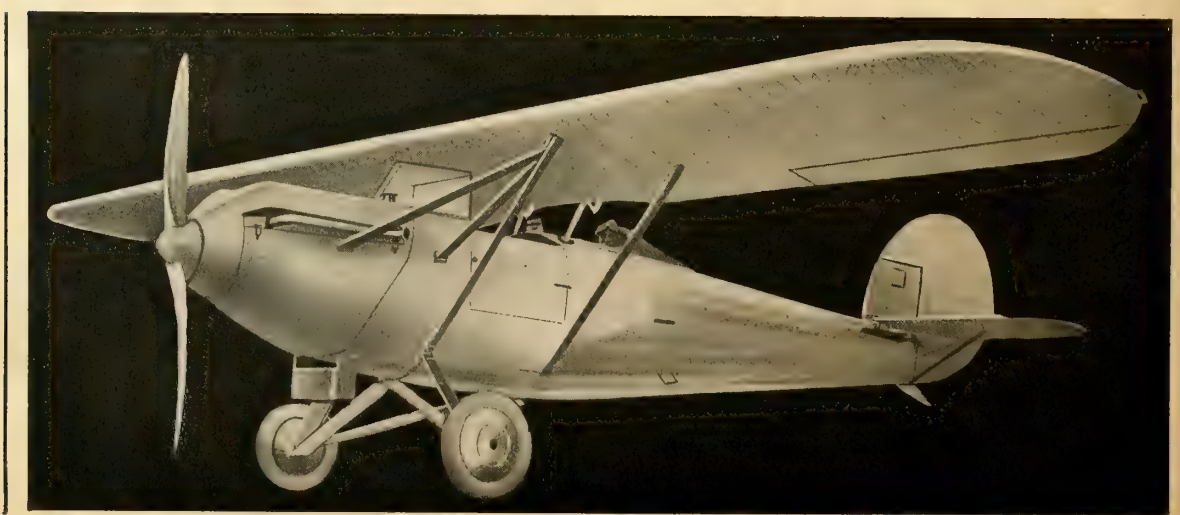
Propellers furnished are of the conventional two bladed wooden type, equipped with aluminum spinner caps and may be Hamilton, Hartzell or Paragon Monoid.

The fuel tank is located in the center section, separated from the engine by the sheet metal fire wall, and holds 38 gallons of gasoline. It is made of heavy terne plate, and may be readily removed without disturbing any other part of the plane's construction, streamlines or coverings. The feed is by gravity through copper fuel lines fitted with Parker fittings, according to government specifications.

The wing, tail surfaces, ailerons and the rear half of the fuselage are covered with grade A Flightex fabric. Four coats of clear dope, two coats of semi-pigmented dope, and two coats of lacquer provide the finish. Aircraft Berryloid is used throughout.

Specifications

Length overall	25 feet 10 inches
Height overall	8 feet
Span	36 feet
Chord	6 feet 3 inches
Wing area, including ailerons	219 square feet
Aileron area	17 square feet
Horizontal stabilizer area	13½ square feet
Elevator area	18½ square feet
Fin area	4 square feet
Rudder area	10 square feet
Weight, empty	1,400 pounds
Gross weight, loaded	2,300 pounds
Power plant, Curtiss OX-5	90 h.p. at 1,450 r.p.m.
High speed (full load, sea level)	105 miles per hour
Cruising speed	90 miles per hour
Landing speed	41 miles per hour
Absolute ceiling	1,600 feet
Gasoline capacity	40 gallons
Range at cruising speed	400 miles



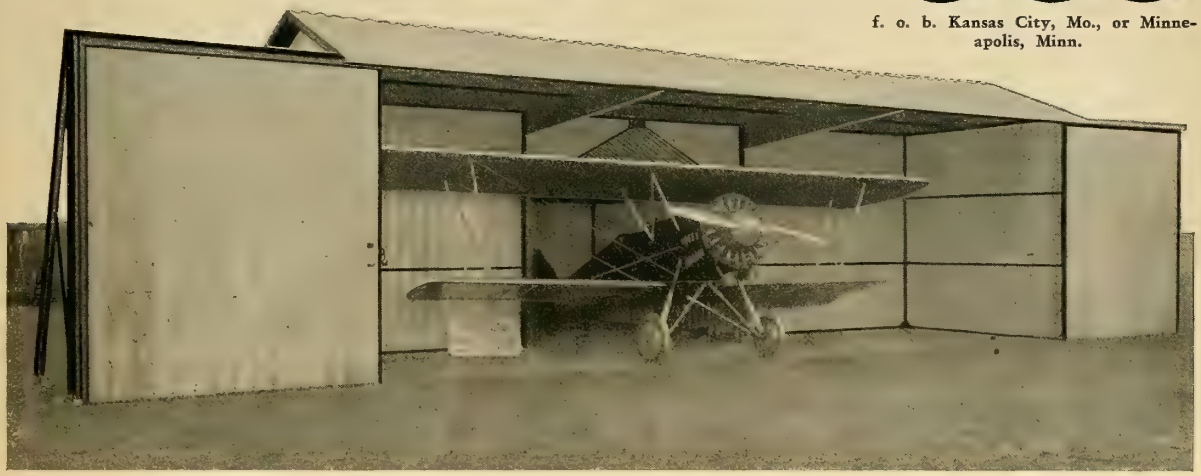
Berliner monoplane powered with the Curtiss OX5 engine has a high speed of 105 m.p.h.

This BUTLER INDIVIDUAL TYPE STEEL HANGAR

Total width, 40′ Total depth, 28′ Height of door, 9′ 6″
Also prices may be had erected.

$565

f. o. b. Kansas City, Mo., or Minneapolis, Minn.



This Butler Steel Hangar (Individual Type) is in the Fairfax Airport, Kansas City, Kans.

There are many advantages to the individual type of Butler Steel Hangar. A few are: Reduces fire hazard; eliminates tampering with plane; allows absolute privacy; saves time in getting out of the building and is economical in cost.

The sheets of Butler Steel Hangars are bolted together and to the steel frame with galvanized bolts. All sheets have deeply drawn paneled corrugations. These corrugations are deeper and wider than ordinary mill corrugations. They are sturdier and stronger. As a result, practically 100% salvage is possible.

Fire Resistant Non-combustible

All Butler Steel Hangars are made of 24 gage tight-coated galvanized steel. Government tests prove that sheet steel is an efficient fire stop.

Prices on Larger Hangars

Attractive quotations are made on larger hangars for one or more planes. The larger hangars have roller bearing equipped doors. The larger hangars may be economically enlarged any time. *Write for complete information and prices.*

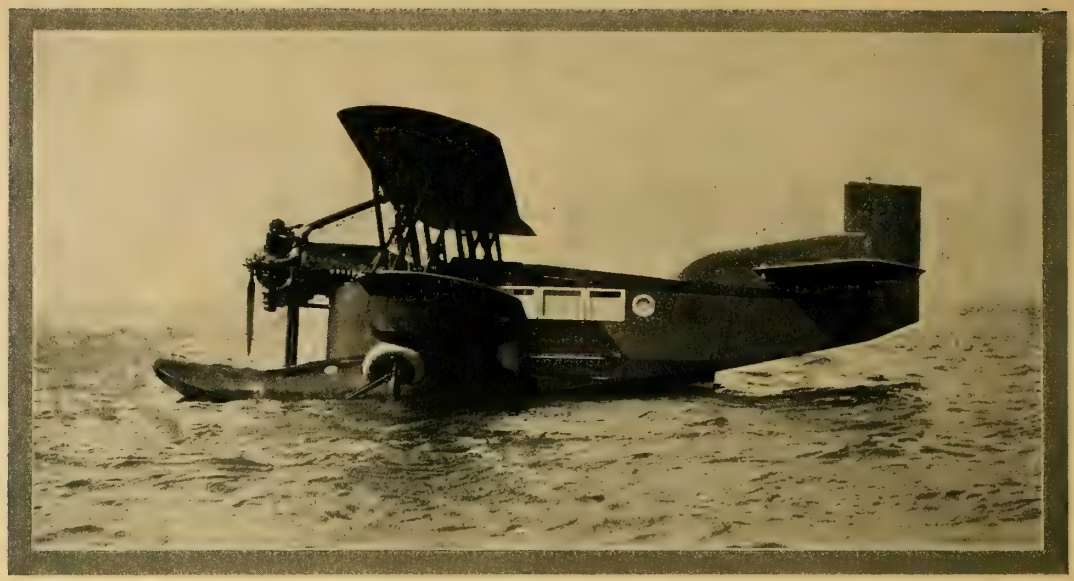
Windows for plenty of light for all working conditions can be furnished at additional cost. Hangars may be taken down, removed and re-erected at least expense. No paint is required unless desired.

Speedy Shipments

At this time these individual type hangars can be delivered without any loss of time. *Write for complete information or specify what size hangar you have in mind.*

BUTLER MANUFACTURING COMPANY

KANSAS CITY, MO. MINNEAPOLIS, MINN.



KEYSTONE-LOENING AMPHIBIAN

KEYSTONE—LOENING AIR YACHT

The 1929 Keystone-Loening Amphibian, accommodating 8 passengers — the Safest and Most Practical single engine airplane manufactured. Powered by the 525 H.P. Wright "Cyclone."

Individuals and Commercial Operators desiring Safety — Comfort — Flexibility — and efficient Performance — will find this latest Loening development surprisingly well suited to their requirements.

High Speed	132 M.P.H.
Cruising Speed	110 M.P.H.
Pay Load	1500 LBS.

Built to Government standards — the choice of well known pilots of both Army and Navy Air Services.

The 1929 "Air Yacht" is on exhibition at Chicago.

AERONAUTICAL CHAMBER OF COMMERCE

KEYSTONE

KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA

WEST COAST REPRESENTATIVE: W. E. THOMAS



"PATRICIAN"

LEADER OF AMERICAN AIRCRAFT

The new 20-Passenger Transcontinental Air Liner — created by Keystone — is ready for quantity production.

Richly appointed — combining a superlative performance with the much desired factors of

Safety–Comfort–Dependability

This airplane is offered as the multi-passenger transport of the future.

Actual Performance Figures — Full Load

High Speed	151 M.P.H.
Service Ceiling	16500 FT.
Pay Load	3880 LBS.

AERONAUTICAL CHAMBER OF COMMERCE

KEYSTONE

KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA

3417 ANGELES MESA DRIVE, LOS ANGELES, CALIF.

NEW GERMAN AERO ENGINES

By Edwin P. A. Heinze

MANY new engines produced by German makers were shown at the International Aircraft Show held in Berlin during October. It is interesting to note that the field has now been entered again by two very old air engine builders, who since the armistice had discontinued production of such motors, namely Daimler-Benz and Argus. The former of these two came out some years ago with the small two-cylinder air-cooled engine used in the Klemm monoplane, but now the company makes a definite attempt again to take up the manufacture of large engines. BMW (Bayerische Motoren-Werke) is doubtless the leading engine manufacturer in Germany, with Junkers as second and Siemens & Halske as third.

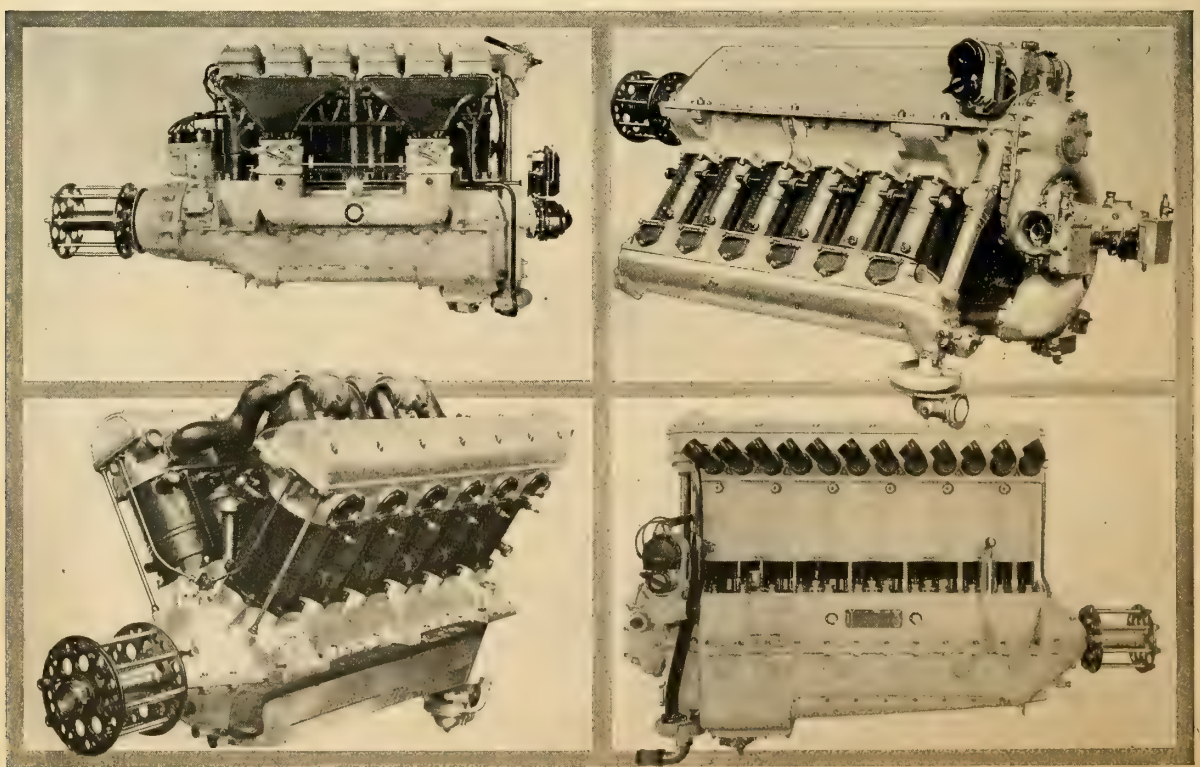
BMW came out at the show with one new 12-cylinder and two new 6-cylinder engines. The first of the new six-cylinder motors has the cylinders all in one block. The individual steel cylinders are inserted in a common water jacket of aluminum with a common head of the same material screwed on. The bore is 6.49" and the stroke 7.48", maximum output 410 h.p., normal output 320 h.p., fuel consumption 0.485 pounds per h.p. per hour, weight dry 738.55 pounds. There are two valves to each cylinder operated by overhead camshaft.

Since the block construction, though having the great advantage of rigidness, has the drawback of being more difficult to handle for inspection and repairs, the makers have developed the other new engine, incorporating much of the experience gained with the former. The first, however, is going to be developed, for its test runs have been more than satisfactory. The second engine, like all other BMW engines, again has all individual cylinders, but owing to a special design of the detachable separate cylinder heads, they are placed so closely together that the engine is very short. The steel cylinders have water jackets welded on in the conventional manner, but each cylinder is open at the top and has an aluminum head of its own, with the two valve seats of steel embedded and the whole valve gear totally enclosed by a separate cover. The cylinder tops have horizontal flanges, to which the heads are screwed from below. The cooling water connections between the 6 cylinder heads are short pieces of rubber hose clamped on in the manner employed in the radiator connections of automobiles. This motor is of the "fast" type, with a normal speed of 2,400 r.p.m. It has a bore of 6.29" and a stroke of 7.08". Its output at the given speed is 530 h.p., the compression ratio being 7.3 to 1. A Farman gear reduces the engine speed to 1,200 propeller r.p.m. An American Eclipse starter is used. The normal output of the engine is 400 h.p. at 2,190 r.p.m. With the compression ratio mentioned, the engine has to be driven on a mixture of 4 parts of benzol and 1 part of gasoline, but if desired other compression ratios, namely 6 to 1 and 5.5 to 1, can be supplied. BMW intends building a a twelve-cylinder motor of the V-type with the same characteristics.

The new 12-cylinder is also such a duplication of a successful 6-cylinder model. Its two lines of cylinders are inclined at 60 degrees to one another. The bore is 6.29" and the stroke 7.48". It delivers a maximum power of 755 h.p. The magneto drive is placed at the front end. A Farman reduction gear and a Rateau compressor are fitted. The constant output of the motor is 600 h.p., and this is maintained up to an altitude of 18,000 ft. The BMW, as is doubtless known to many of our readers, has acquired rights from the Pratt & Whitney Aircraft Company for manufacturing the Hornet and Wasp engines. The German makers evidently want to be equipped for every demand, and the Hornet motor is already in production. Many orders have been given for it at the show, we hear. Among others, the Junkers works have ordered a number of these engines for their trimotored air transports.

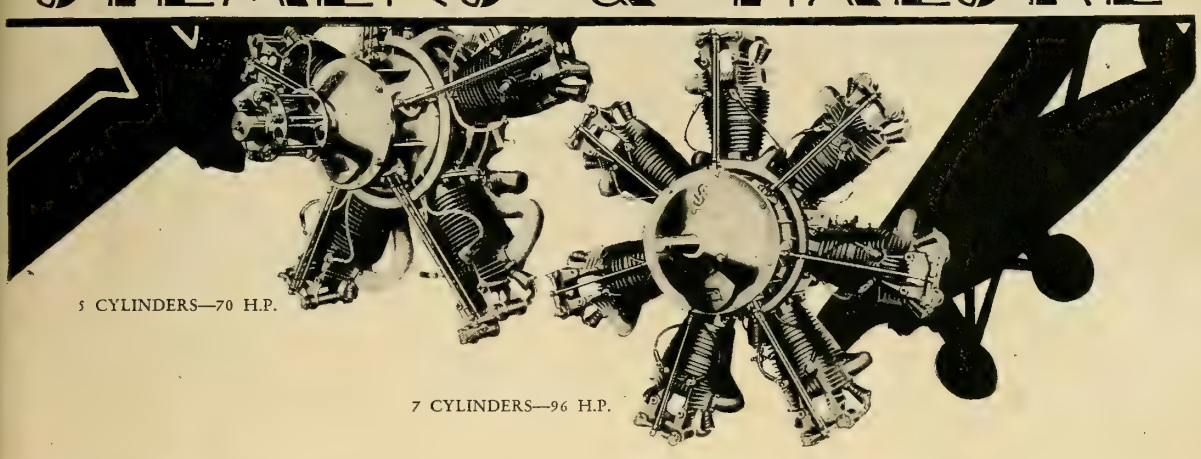
The Junkers company also has come out with two new water-cooled engines,—one is a 6-cylinder and the other a 12-cylinder V-engine. Both motors have a bore of 6.29" and a stroke of 7.48". Contrary to BMW, Junkers believes in 4 valves per cylinder, these being operated by two camshafts over each line of cylinders. The cams work directly on the valve stems, which are fitted with cam following caps. The cylinders have no detachable heads. The crankshafts in both motors run in roller bearings and are fitted with vibration dampeners, that are

(*Continued on next page*)



At the top—the type VII BMW and the inverted Argus engine. Below, the 12-cylinder Argus and 6-cylinder BMW engine.

SIEMENS & HALSKE



AIR-COOLED AIRCRAFT ENGINES

SIEMENS and HALSKE aircraft engines now can be obtained direct from the factory through K. G. Frank, American representative of the Siemens and Halske Company. A service depot has been established at Curtiss Field, Long Island, N. Y. More will be formed in the near future.

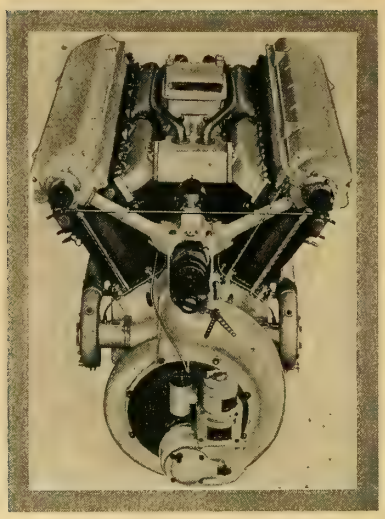
Our exhibit at the Chicago Aeronautical Show is the same as was used at the International Aeronautical Exposition recently held in Berlin, Germany. A complete line of SIEMENS & HALSKE ENGINES ranging from 70 to 600 horsepower is on display.

There are new features of the 5 and 7 cylinder engines which will be of great interest to aircraft operators and manufacturers. Ask to see them!

For complete details and information address

K. G. FRANK
CONSULTING ENGINEER

General American representative SIEMENS *and* HALSKE, A.G.
75 WEST STREET NEW YORK, N. Y.



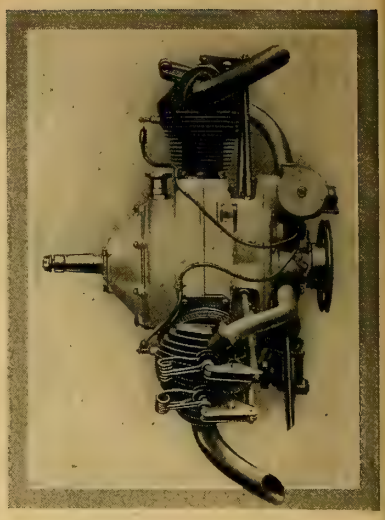
Daimler-Benz 1000 h.p. engine.

(*Continued from preceding page*)

claimed to reduce torsional vibration by 50%, making possible the use of an ordinary spur wheel reduction gear with a ratio of 2 to 1. The crankshaft speed of both motors is 2,100 r.p.m., and the 6-cylinder motor delivers 420 h.p., the 12-cylinder 850 h.p., with a compression ratio of 5.5 to 1. The weights of the motors are 881 and 1,433 pounds, respectively. A two-stage turbo compressor, such as that employed on the old L55 engine, will also be fitted to this engine. It is geared up 7.4 to 1 against the crankshaft, and a hydraulic clutch is interposed to permit regulation of the compressor speed during flight. In fact the adjustment might be accomplished automatically if a single regulating device operated by atmospheric pressure could be installed. This possibly will be done in the near future. The compressor arrangement is remarkable in that fresh air is sucked in by the compressor and delivered through a specially constructed Sum carburetor to the intakes.

Siemens & Halske is the only manufacturing company in Germany that has for a period of years confined itself solely to building air-cooled radial engines, and most of the light and medium sized sports airplanes in this country are equipped with such motors. Siemens & Halske has hitherto made such engines mainly with power outputs ranging up to 125 h.p., but has now entered the high-power field. The company procured a building license from Gnome-Rhone for the Bristol-Jupiter, but afterwards decided to revert to its own construction and has now just completed two new radial engines with the designations SH 20 and SH 21, having seven and nine cylinders, respectively. A further new motor, which is to deliver 700 h.p., is said to be in preparation. The special feature of Siemens & Halske engines is the cylinder construction and the firm adherence to only 2 valves per cylinder. The cylinders consist of open steel tubes with a fastening flange at the bottom. Over this tube or insert, a finned aluminum hood is screwed while in a hot state. This hood reaches almost to the cylinder foot. The combustion chamber in the aluminum head is semi-spherical in form, and the two valves employed are arranged slantingly opposite one another. The use of only two valves allows better cooling of the cylinder head than the use of four valves. Also it simplifies the valve mechanism. The push-rods are enclosed, and the magnetos are situated in front. A Farman reduction gear is employed, and the rotating gas distributor and the drivers for the other auxiliaries are united in a special casing at the back of the engine. This unit can be removed bodily without dissembling any part of the engine proper or of the fuselage.

Daimler-Benz has produced a very compact looking 12-cylinder V-motor, with two lines of 6 cylinders inclined at 60 degrees. The bore is 6.49", the stroke 8.26", and the total piston displacement 3,288 cubic inches —the biggest water-cooled motor built in Germany. Working with the turbo-compressor which is provided, it is supposed to develop 1,000 h.p. and, without the compressor, 800 h.p. The cylinders of each line have a common aluminum head, with overhead camshaft and valve gear wholly inclosed. Each cylinder has four valves. The camshafts and auxiliaries are driven at the rear end by a wholly inclosed drive shaft and bevel drive. At the junction of the three Y-shanks, there is a horizontal shaft parallel to the crankshaft; the rear end of this shaft drives a magneto situated on a bracket above the compressor, and at the front end a 200-watt generator is fixed. It

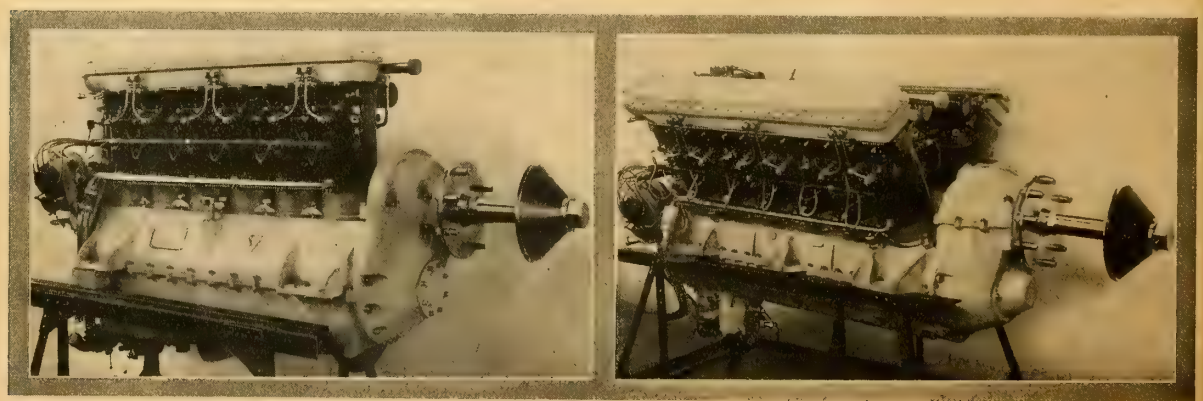


Daimler-Benz 30 h.p. engine.

is located in the angle formed between the two sets of cylinders beneath the carburetors. At the bottom of the Y-drive, there is a transverse shaft operating the two centrifugal water pumps, one for each line of cylinders. Dual ignition is provided, one by the magneto, the other by coil, both working with separate sets of plugs. The well known American Eclipse electric starter is incorporated. The crankshafts and big-ends run in roller bearings and lubrication is effected by one pressure and two suction pumps. Four floatless carburetors of a special design are united to a block and located between the cylinders. Their jets are accessible via the scoop at the top, which is meant to protrude through the engine cowling and to act as a kind of safety device in case the engine backfires. The carburetors are fed by two independent fuel pumps, one of which will suffice in the event the other fails. The motor is comparatively slow, for its speed does not exceed 1,500 to 1,600 r.p.m. Nevertheless, it is geared down by a spur wheel reduction set with a ratio of 1.96 to 1.

Besides this motor, the Daimler-Benz company has also brought out a small 3-cylinder air-cooled radial engine with an output of 30 h.p. A side view of this engine is shown in the illustration above.

(*Continued on next page*)



The 6-cylinder and 12-cylinder Junkers engines of 420 and 850 horsepower.

THE BELLANCA C H

ENGINE, Wright Whirlwind
SPEED, Official, 126 miles per hour
LANDING SPEED, 46 miles per hour
CRUISING RANGE, 800 miles
FUEL, 90 gallons in two tanks
PAY LOAD, 1,430 lbs.



First in Every Efficiency Competition Entered

CAPACITY, Six Persons and Baggage
FUSELAGE, Chrome Molybdenum Steel Tubing
CONTROL, Dual, Side by Side
VISION, Full, Sliding Windows
CABIN, Heated and Lighted
LANDING GEAR, Cantilever Axle-type

BELLANCA AIRCRAFT CORPORATION
NEW CASTLE DELAWARE

Descriptive Booklet Mailed on Request

FIRST IN EFFICIENCY

(*Continued from preceding page*)

The Argus company has re-appeared with two 12-cylinder V-engines, one upright and the other inverted—the only inverted engine in Germany. Both are identical in all main details. The bore is 6.49" and the stroke 7.08", giving a piston displacement of 2,119 cubic inches. Like the Daimler-Benz engine, each cylinder has four valves and the six cylinders of each line are united by a common head totally enclosing the camshaft, driven by an inclosed shaft and bevel gears from the crankshaft at the rear end. There also are the two magnetos, which are driven off a transverse shaft. The crankshaft runs in eight babitted main bearings. In the inverted engines, the designers have kept clear the space between the cylinders. Hence the induction pipes are very long and there are feeding difficulties at the front end cylinders. To overcome these a simple turbo-blower is fitted at the rear, which sucks gas from the two Sum carburetors and presses it into the intake pipes. The air for the carburetors is drawn in through the crankcase where it is made to cool the main bearings. The other motor employs two Zenith carburetors, which are situated between the cylinders. Both motors are said to have a constant output of 700 h.p. Reduction gear is not used. Since they had been finished just in time for the show, their effective outputs, as well as that of the Daimler-Benz engine, remain to be determined. The Argus company also has taken into production a stock compressor of the Roots type. It weighs 106 pounds and conveys 1.65 pounds of air per second.

The Junkers concern had various highly interesting exhibits at the Exhibition showing the work of its research department. Among others there was a huge 5-cylinder Diesel engine which works on the Junkers principle and is being developed for air work. The engine has two crankcases and and crankshafts, one on top of the cylinders and the other in the usual place, the crankshafts being connected at the front end by a train of gears. The engine is said to develop at present 800 h.p., but it weighs approximately 5,000 pounds.

CHANGES IN THE TRAVEL AIR TYPE 6000

SINCE the description and illustrations of the Travel Air type 6000 were published in the June issue of AERO DIGEST, several important improvements have been made in the planes of this type which are now in regular production. A considerable degree of refinement is apparent—better streamline, more practical windows and other up-to-date improvements in detail.

The Travel Air Manufacturing Company is now in regular production on this type of ship and is delivering them as fast as they can be put through the factory. The first standard production job was purchased by Mr. Wilbur D. May, of Los Angeles, Cal.

Changes in specifications from the first ship of this type are as follows:

The ship is now designed for any engine up to 300 horsepower. The front of the cabin is 4 inches wider and 5 inches longer. Fuselage 4 inches wider at front of stabilizer. Throttle changed from side to center. Door at front omitted and replaced with windows. All glass raises and lowers by means of a small nickle plated crank. All glass in front of pilot is non-shatterable. Cabin windows are 32 by 15 inches. Pilot's side windows are 18½ by 17½.

The wing has a span of 48½ feet with a 78-inch chord. A fuel tank in each wing gives a total of 80 gallons of gasoline. Landing lights are built into the wing; they are lowered by means of a worm drive and can be set at any angle.

Back of the cabin are two emergency landing flares, battery and tool space.

The tail skid is replaced with a stern wheel 14 by 3 mounted on an Aerol strut. The landing gear is also mounted with Aerol struts with Bendix wheels and 36 x 8 inch tires.

The wings are orange, fuselage black and striping chrome yellow. Color options are offered without additional charge.

The cabin interior is finished with a special Du Pont fabric especially made for this use. Cabin chairs are held firmly in place by a specially designed arrangement, at the same time they are easily removed.



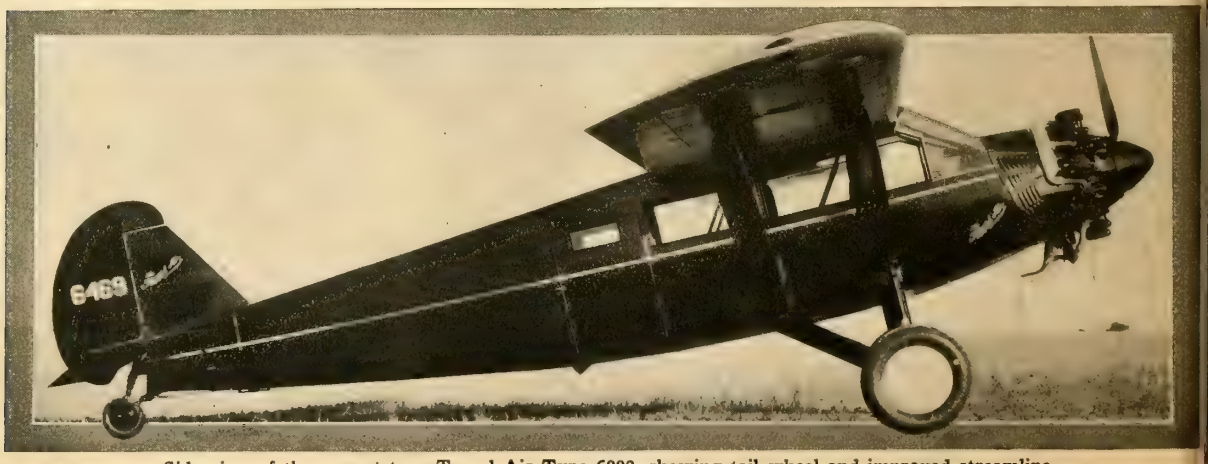
NEW PIONEER COMPASS WITH MICROMETER COMPENSATOR

A REVERSIBLE magnet has been constructed and given practical application as a compensator for a magnetic compass by the Pioneer Instrument Company, Brooklyn, New York. The development has become standard equipment on all magnetic compasses manufactured by Pioneer.

Designated the Titterington Micrometer Compensator, the new reversible magnet is amazingly simple in principle and equally effective in application, compensating the compass by turning two sets of screws until the proper direction headings are effected.

In construction, the compensator is composed of two permanent magnets with North poles at both ends and South poles in the centers. The effective external field of the magnets, which are situated in the compass at right angles to one another, is zero inasmuch as the two magnets balance each other. The problem now arises of creating a dominating field within an area allowing assertion of South or North influence. Hence, soft iron tubes, half the length of the magnets, are slipped over them to act as shields.

(*Continued on next page*)



Side view of the newest type Travel Air Type 6000, showing tail wheel and improved streamline.

ALWAYS *with the leaders!*

FROM the time of the World War, when the Government adopted HASKELITE, this weatherproof plywood has been identified with the leaders in aviation. Lindbergh's epic flight to Paris; a steady record of 6,000 miles per day by commercial Boeing planes; Waco Ten's winning of the 1928 Air Tour, and the winning of 69 out out of 70 prizes at this year's air races — these are typical of the scores of examples proving the choice of HASKELITE by the leaders.

Send for valuable information concerning the use of HASKELITE in aircraft.

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120 South LaSalle Street, Room 1120 Chicago, Illinois

California Panel & Veneer Co.
955 S. Alameda Street
Los Angeles, California

Railway & Power Engineering
Corporation, Ltd.
Montreal, Toronto, Winnipeg
New Glasgow



AD 12-Gray

(Continued from preceding page)

When placed in the middle, the effective external field remains at zero.

So that the tubes may be moved in either direction to shield any portion of the magnets and to provide the requisite field, gears meshing with the two sets of screws, designated E-W and N-S, allow movement of the tubes and hold them permanently in place.

If the tubes were moved to the end of one magnet, the external half of the other end would be fully effective, and the usual N-S magnet would result. Moving the shield to the other end of the magnet leaves an external field of an S-N magnet of maximum strength. Inasmuch as the tube may be placed in any position, stopping at intermediate points shields each field in definite proportions and leaves an effective external field of any required strength in either direction.

To secure the required amount of magnetic force, it is simply necessary to turn screws which are exposed just between the letters E-W and N-S. The upper screw introduces magnetism for correcting the compass on East and West headings, and corresponds to the fore-and-aft tube of the old loose-magnet compensator. The lower screw is used for correcting the compass on North and South headings and corresponds to the athwart-ship tube of the old compensator.

The process of compensation is simple. Once true directions are determined, while the plane is on the ground, head the nose due North (magnetic). If the compass does not read North, turn the lower compensator screw until it does. To do so, a special non-magnetic screw driver should be used, or a thin blade of brass or aluminum will serve. Next, head the ship due West. If the compass does not read W., turn upper compensator. After that the plane should be headed South, and the lower screw should be adjusted to take out but one half the error, if one is found, for adjusting the screw to effect a correct reading would introduce the same error in the North reading. The same process applies to the correction of the East readings, only half of the error being taken out as a compensation. To check further, the airplane should be turned successively, N. 330, 300; W. 240, 210; S. 150, 120; E. 60 and 30 degrees, noting the compass indication on each heading.

AC AMMETER FOR AIRPLANES

CURRENT flowing through the AC ammeter creates a magnetic field which distorts the magnetic field of a permanent magnet. A small piece of iron pivoted to swing freely aligns itself with the distorted magnetic field. A pointer attached to and moving with this piece of iron registers on the dial the amount of current. An unusually steady pointer is obtained in the instrument by carefully proportioning the weight of the pointer and the strength of the magnetic fields on the small piece of iron.

The A. C. Spark Plug Company manufactures spark plugs, fuel pumps, thermos and oil gauges, gasoline strainers, oil filters and other accessories.

THE LAIRD TYPE LC-R

THE E. M. Laird Airplane Company of Chicago designed and manufactured the Laird LC-R plane, in which E. E. Ballough won second place in the class B transcontinental race, New York-Los Angeles, and second place in the Los Angeles-Cincinnati race. C. W. Holman used the Laird in winning first place in the class B race from Los Angeles to Cincinnati. The Laird LC-R is powered with a Wright Whirlwind engine.

This type of plane makes an ideal sport or mail plane where high speeds are desired with an engine in the Whirlwind power class.

Specifications—Model LC-R

Span, upper wing	28 feet
Span, lower wing	24 feet
Length overall	23 feet 6 inches
Height overall	9 feet 3 inches
Gap	4 feet 6 inches
Total wing area	202 square feet

Weights

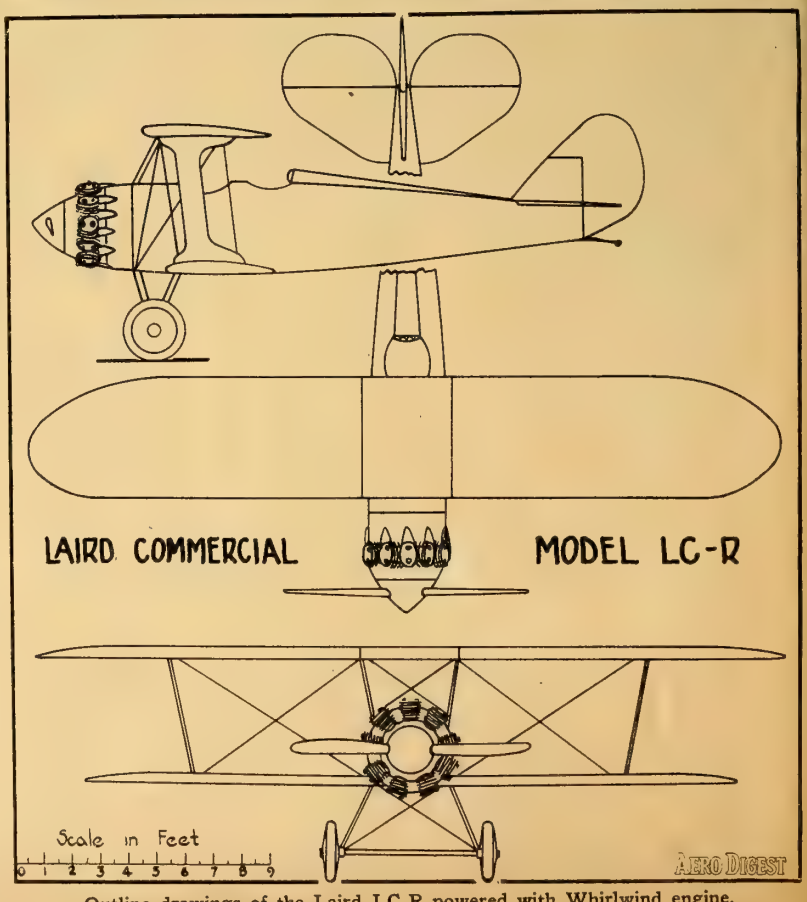
Weight, empty	1,580 pounds
Fuel load	460 pounds
Net pay load	340 pounds
Weight of pilot	170 pounds
Gross weight	2,550 pounds

Performance

Maximum speed	160 miles per hour
Cruising speed	120 miles per hour
Landing speed	60 miles per hour



"Speed" Holman and the Laird LC-R he flew in the transcontinental air race.



Outline drawings of the Laird LC-R powered with Whirlwind engine.

"FOLLOW THE CHOICE OF EXPERIENCE"



Trimotored Leviathans... Single Motored Transports... Light Sport Planes

STANDARD Steel Propellers are standard equipment on almost every type of airplane. They are used extensively on most of the huge trimotored planes which carry passengers, mail and freight throughout all parts of the country . . . on the single motored open and closed ships which transport thousands of people each year on pleasure and business jaunts and carry the mail to and from every important city in the United States and numerous foreign countries . . . on the thousands of light sport planes now in vogue for student training and sport flying. In fact, there isn't one ship built on which a Standard Steel Propeller can not be used to advantage.

The fact that Standard Steel Propellers were used on the majority of National Air Race winning planes, National Reliability Tour planes, (in which all types and sizes participated), Transatlantic, Transpacific and Transcontinental planes, proves beyond a shadow of doubt that the producers of the most popular and reliable planes and power plants "follow the choice of experience".

STANDARD
PITTSBURGH
PENNSYLVANIA
STEEL PROPELLER CO.

PEGASUS 225 H. P. ENGINE

THE "Pegasus" nine-cylinder radial air-cooled engine is produced by the Rocky Mountain Steel Products, Inc., of Los Angeles, Calif. This engine has been engineered to meet both army and navy standards and is equipped with dual machine gun synchronizers.

The engine has nine forged steel barrels with the cooling fins turned integral, aluminum alloy heads. Valve actions and push-rods are carried at the front of the engine. All accessories and drives are located at the rear. These are so arranged that they are not dismounted when the engine is being installed in the plane, since they will all pass through the standard 19¼-inch mounting ring.

The aluminum alloy crankcase consists of three major pieces. The center case on which the cylinders are mounted also carries the triple-intake manifolds, which are cast integrally with this main case, providing the most satisfactory carburetion of the fuel. The rear case carries all accessories and their drives. The front case covers the cam and timing gears, and mounts the valve tappet guides and crankshaft thrust bearing. Studs are provided on this cover or front case on which to mount the engine cowling. The main oil lines are cast into the crankcase.

In the production models, the crankshaft is mounted on ball bearings throughout. It is of the hollow two-piece type which simplifies lubrication and permits the use of a single piece master connecting rod, thus lightening the weight of the reciprocating parts. A feature of this shaft is the large crank pin, which measures 2¼ inches in diameter and 3½ inches in length between the crank cheeks. The crankshaft master and articulated rods, as well as the rocker arms, are all of forged chrome vanadium steel.

The master rod is of the H type design. Articulating rods are of the hollow tubular type, machined and finished all over.

Pistons are of Y metal, a nickel aluminum alloy of high heat resisting quality. These are equipped with three rings above the piston pin. An oil groove is machined just below the bottom ring and provided with drain holes to carry excess oil from the cylinder walls back to the oil sump. A full floating type of piston pin 1⅜ inches in diameter is used. On each end this carries aluminum alloy plugs to protect the cylinder walls. The piston rings are ground all over.



Front view, Pegasus 225 h.p. engine.

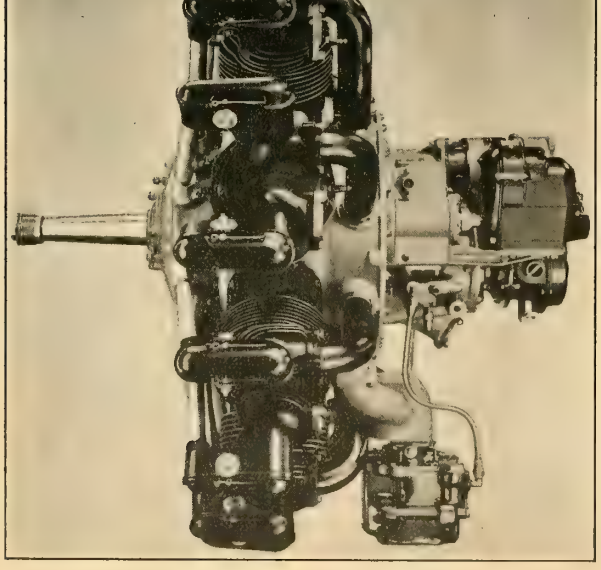
The steel cylinder barrel is anchored to the crankcase by eight nickel steel stud bolts. This barrel is turned from a steel forging, the original forging weighing about sixty pounds in the rough, and the finished cylinder barrel carrying the sixteen thin cooling fins. The finished mounting flange and head flange weighs about eight pounds. The aluminum alloy cylinder head is screwed and shrunk to the barrel. The thread used is of the buttress type which presents the flat surface of the thread to resist all power impulses. Spark plug bushings of aluminum bronze are screwed and shrunk into the head at diametrically opposite points at front and rear.

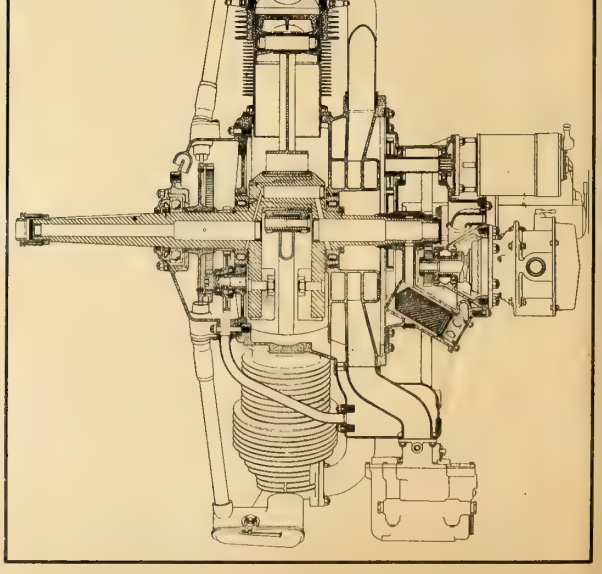
Standard eighteen-millimeter aviation spark plugs are used. Each head carries two valves two inches in diameter seating in a special bronze valve seat in the dome shaped head. They are mounted at such an angle as to provide accessibility and obtain the maximum amount of power from the fuel. Exhaust and intake ports are both taken off at the rear of the head. This carries the heated exhaust gases away from the motor quickly and improves the streamlining of the ship as well.

In the exhaust valve arrangement the entire valve stem guide is exposed to the slipstream of the propeller. This flow of cool air passes against and around it through a passage provided beneath the exhaust rocker arm box or housing. The exhaust ports are exceptionally large, heavily finned to provide additional radiation, and the use of salt cooled valves with large diameter stems helps to dissipate the heat.

The rocker arm boxes are cast as a part of the cylinder head. These box covers are quickly detachable without using tools. Rocker arms are carried on Timken bear-

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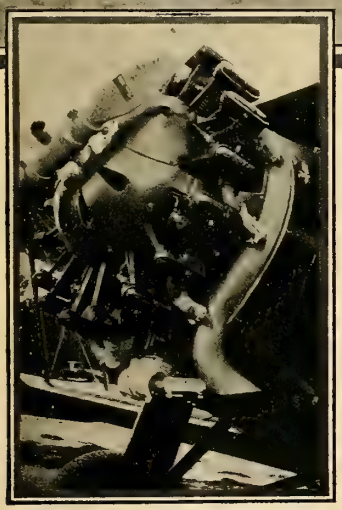


Direct side view of the 9-cylinder Pegasus engine and a longitudinal section showing construction details.

Now Used on 9 Air Mail Lines

the PITCAIRN SUPER-MAILWING





Showing the stream-lined exhaust manifold, one of the many unique features of the Pitcairn Super-Mailwing.

Designed primarily for the purpose of carrying mail and express, the new Pitcairn Super-Mailwing is already flying on 9 contract air mail lines. High cruising speed, marked maneuverability and economical maintenance are responsible for its widespread popularity.

For private operation the Pitcairn Super-Mailwing can be furnished with the mail compartment converted into a spacious passenger cockpit with dual control, providing ample room for two passengers and baggage. It thus becomes a sport plane of the highest performance characteristics.

See the Super-Mailwing at the Chicago Aero Show, December 1 to 9, inclusive, or write us for further information.

PITCAIRN AIRCRAFT INC.

LAND TITLE BUILDING PHILADELPHIA

(*Continued from preceding page*)

ings. A lubrication reservoir is provided within the rocker arm connected with a hollow bolt so that these bearings may be lubricated from the zerk fitting on the end of the bolt outside the box. The valve stem end of the rocker arm is lubricated throughout a felt pad reservoir, the push rod end being lubricated by means of an oil duct through the center of the arm.

The valve gear consists of a double ring cam carried at the front of the main case on the hub end of the crankshaft. This cam is driven at the desired speed through spur and internal gears, which in turn are carried on ball bearings. The valve tappets are conventional in design. Push rods are tubular with ball ends covered by an aluminum tube, which is also quickly detachable without the use of tools.

Auxiliary drives at the rear of the engine are mounted on narrow type ball bearings. Gears and steel parts are of heat-treated chrome nickel steel, ground to final dimensions.

Forced feed lubrication is by means of a duplex pipe which draws oil from the exterior reservoir, passes it through the filter located within the engine, and then to the rear end of the hollow crankshaft. Large oil leads through the cranks and crank pin carry the oil to the forward end of the engine, where it lubricates the cam and its drive gears, the thrust and other bearings and the valve tappets, and then flows down through the front end of the case to the oil sump (which is cast as a part of the intake manifold), accomplishing its double purpose at this point of heating the incoming gas and being itself cooled and pumped back to the exterior reservoir. All auxiliaries, master rods and articulating rod bearings are lubricated by leads from the interior of the hollow crankshaft. Cylinder walls are oiled by splash. Large breather openings are provided, one at the forward side of the front case and one at the top rear of the back case. The scavenging side of the pump has more than twice the capacity of the pressure side, providing further insurance against oil line stoppage and keeping the engine free of excess oil.

The carburetor used is a Stromberg NA-T-4 type, having one float chamber and three barrels with three venturis. Each barrel of the carburetor supplies fuel to a unit of three cylinders through a separate section of the triple intake manifold. This design insures even distribution of fuel and carries the additional safety factor which prevents any accident that might happen to one cylinder of any group from affecting the operation of the other six. The Pegasus engine is equipped with a special fuel pump originated by the Rocky Mountain Steel Products, Inc. The mounting dimensions of this pump are the same as the C-5 army specification pump. In the Pegasus, however, the relief valve and by-pass valves are integral with the pumping body, thus creating a complete unit. The valves within this pump have a specially designed seat which prevents their dancing or fluttering.

Anti-friction bearings are used throughout. These have been selected as are required by the design; they are Strom, SRB, Timken and Norma-Hoffman, as best suited to their particular location in the engine. Two Scintilla magnetos are mounted at the rear of the engine in a protected position. These are driven by spur gears. The magnetos are mounted on the same horizontal plane as the crankshaft. The distributor and breaker boxes are readily accessible. B. G. Hornet type spark plugs are standard equipment. A mounting is provided for any standard fifteen-volt, fifteen-ampere aviation type engine driven generator. The standard type Eclipse aviation inertia starter can also be mounted as an accessory unit. Several locations of the position of the cranking handle of this inertia starter are possible. A standard tachometer drive is provided. A dual drive is also provided for machine gun synchronization when the motor is used for military purposes.

ZEP CARRIES PRESTONE

FIFTY gallons of Eveready Prestone, the anti-freeze marketed by the National Carbon Company were aboard the great German airliner, *Graf Zeppelin*, when she sailed majestically away from the hangar at Lakehurst, N. J. to her native port in Germany. The anti-freeze was taken aboard after her Commanding Officer had decided that the increasingly cold temperatures above the Atlantic would require that protective measures be taken to prevent damage to the twelve-cylinder water-cooled Maybach engines. Since the successful test by the Bureau of Aeronautics of the Navy Department in 1925, of Eveready Prestone, following its introduction to the market by the National Carbon Company, a number of airships in the United States service have adopted the anti-freeze as protection against zero weather.

CHALLENGER C-4 BIPLANE

THE Challenger Model C-4 biplane, a product of the Kreider-Reisner Aircraft Corporation, is an open cockpit commercial type powered with a 7-cylinder, 150 horsepower, air-cooled Comet engine. This engine is started by compressed air, thus reducing the starting hazard.

Stabilizer is adjustable in flight and is operated from the pilot's cockpit. Ailerons are on the lower wings only. They extend the entire length of the wings to the walks.

Landing gear is the split type. Mechanical brakes are used.

Fuselage is of conventional design, the construction being of aircraft seamless steel tubing with all joints acetylene welded. A large baggage compartment is located on the side of the fuselage aft of the pilot's cockpit. Large gasoline and oil tanks are located in front of the passenger's cockpit. These tanks give the plane a cruising range of between 400 and 500 miles.

Both the passengers' and the pilot's cockpits are roomy and comfortable. There are seats for three persons, including the pilot. The pilot's cockpit is equipped with all necessary flying instruments. A new headrest for the pilot adds to the streamlined effect. The plane is produced in an attractive green and yellow color combination.

Specifications

Length overall	23 feet 2 inches
Height	9 feet 3 inches
Span	30 feet
Dihedral (Upper wing)	1 degree
Dihedral (Lower wing)	2½ degrees
Stagger	14 inches
Gap	63½ inches
Chord	63 inches

Areas

Area wing including ailerons	285 square feet
Area aileron	36 square feet
Area stabilizer	20.3 square feet
Area elevator	17 square feet
Area rudder	7.5 square feet
Area fin	4 square feet

Weights

Weight, empty	1,330 pounds
Gas and oil	330 pounds
Useful load	1,070 pounds

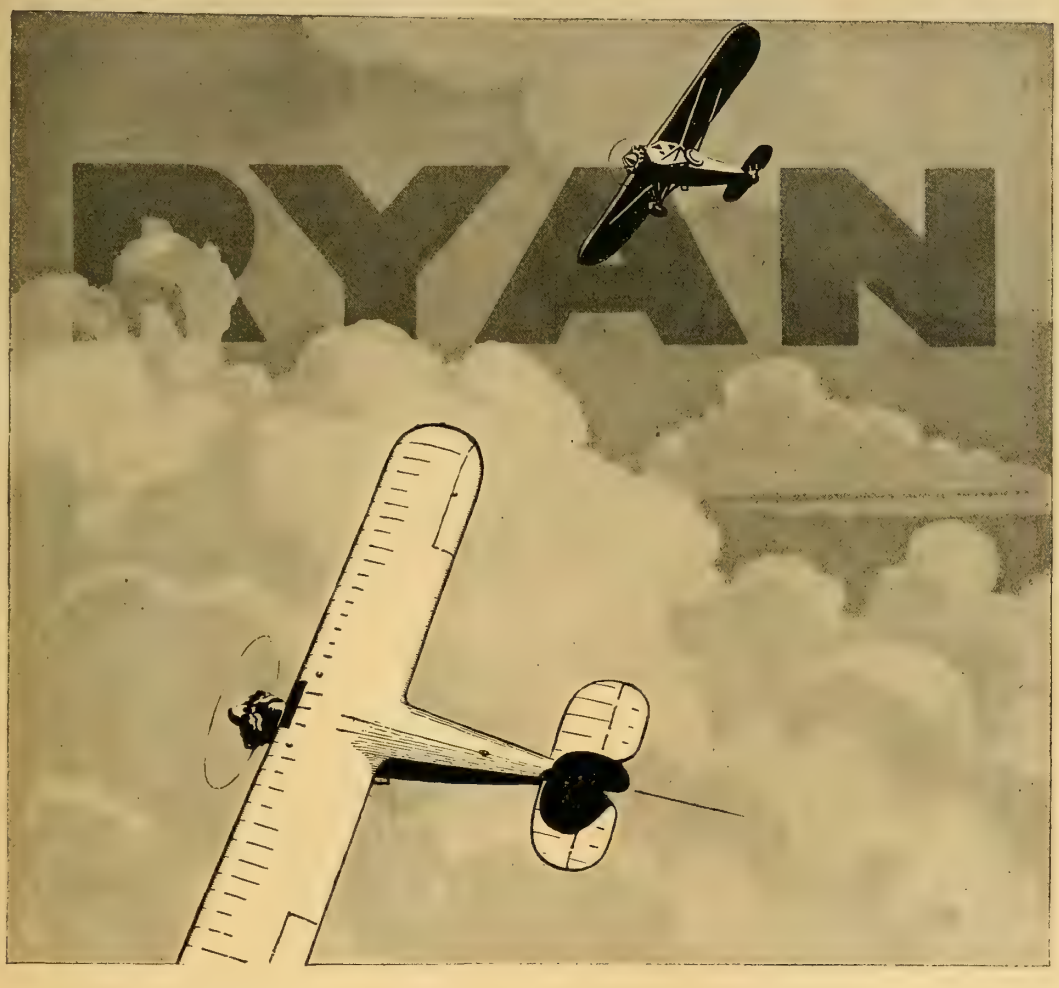
Performances

High speed	120 miles per hour
Landing speed	38 miles per hour
Rate of climb	820 feet per minute
Service ceiling	14,500 feet per minute



Challenger biplane powered with a 7-cylinder Comet engine.

A SISTERSHIP TO THE "SPIRIT OF ST. LOUIS"



A NEW RYAN BROUGHAM FOR SIX

Will be Shown at Chicago!

THIS new addition to the Ryan line is as painstakingly and succcessfully engineered for the 325 h.p. Wright motor as the five-place Brougham is designed for the Wright Whirlwind power plant. The standard Brougham outperforms all cabin monoplanes of like capacity and power. You can anticipate as great a relative superiority in the larger model, the Ryan Brougham for Six. Its performance is such as you would expect of similar ships with from 400 to 500 h.p. ¶ The five-place Ryan Brougham, the leader in its field, of course is continued. Refinements, but no radical changes, will be noted. ¶ We hope for the pleasure of your presence at our Chicago Show exhibit.

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The Ryan Brougham is Approved Type No. 25

THE MAHONEY-RYAN AIRCRAFT CORP'N

Anglum, (St. Louis County) Missouri

AM-13B

THE SPORT WACO TYPE 10 T

IN response to the demand for a high performance airplane for sport and for high speed commercial work, the Advance Aircraft Company started development work early this year on the tapered wing biplane, now known as the "Sport Waco". It was essential to have high speed, stability, with good maneuverability, without sacrificing the Waco characteristics of quick take-off, rapid climb, and slow landing speed.

The first airplanes of this model were produced in May of this year, but owing to the rush of production on the straight wing model, the Sport Waco did not get into actual production until July.

The Sport Waco was used by John Livingston, in winning the transcontinental derby (Whirlwind motor class); likewise the sweepstakes prize for the best time in all classes of the transcontinental races between New York and Los Angeles.

It is a single bay biplane of tapered M-6 section, the wings having been designed with a load factor based upon a power loading with motors up to 400 horsepower. This involved the use of very substantial spar and rib construction, as well as fittings and external bracings to withstand such loads.

The center section is very wide and extends beyond the struts to a point where the spar bending moment is zero. The thick wing section permits use of comparatively large center section tanks.

Both upper and lower surfaces of the leading edge are reinforced with duralumin, the trailing edge being of copper coated steel. Flightex fabric is used for covering, which is doped, sanded and finished to a smooth surface. Four narrow chord ailerons are operated by the Waco system of tubular push rods and bell cranks.

Fuselage is characteristic Waco welded steel tube construction without wire bracing of any kind, this being made up as a unit including the motor mount. The entire fuselage structure is sand blasted before prime coating, all opens being sealed by welding to prevent internal corrosion. The turtle deck is of spruce and mahogany plywood; spruce fairings members being used on the sides and bottom of fuselage, sheet aluminum cowling to the rear of the pilot's cockpit, and streamlined headrest on the pilot's cockpit.

Two types of landing gear are available on the Sport Waco, the speed model landing gear being of the type used on the Waco Nine, lugs for which are provided on all Waco airplanes. The Waco oleo type split axle landing gear is also available, with option of either 26 by 4 or 30 by 5 wheels, with or without Bendix brakes. The Waco leaf spring tail skid with manganese steel tail skid shoe is used.

The Sport Waco can be had with either Hisso 180 horsepower motor, or with the Wright J-5 Whirlwind motor. It will also be available with the new 300 horsepower Wright J-6 motor in the early spring. This engine is illustrated and described elsewhere in this number of AERO DIGEST.

Gas tank equipment will be provided to suit the particular use for which this model is purchased, the standard equipment being a 68-gallon main tank in the fuselage. This can be supplemented by two center section tanks giving 35 gallons additional capacity. If the fuselage space is desired for cargo, a 65-gallon gasoline capacity can be arranged by the use of lower wing tanks in addition to the center section tanks.

Ample space for luggage is provided in the luggage compartment to the rear of the pilot's cockpit. Dual control is standard equipment. Instrument equipment and color combination of both fuselage and wings are to customer's order.



Showing tapered wing Waco 10T.



The Sport Waco in inverted flight.



The Sport Waco with Whirlwind engine, oleo landing gear and Bendix brake equipment.

YOUR LONG AWAITED OPPORTUNITY HAS COME!

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IN THE GREATEST AMERICAN CITY

IN THE GREATEST AERONAUTICAL MARKET

and

UNDER THE EYES OF A POTENTIAL AUDIENCE OF 12,000,000 PEOPLE

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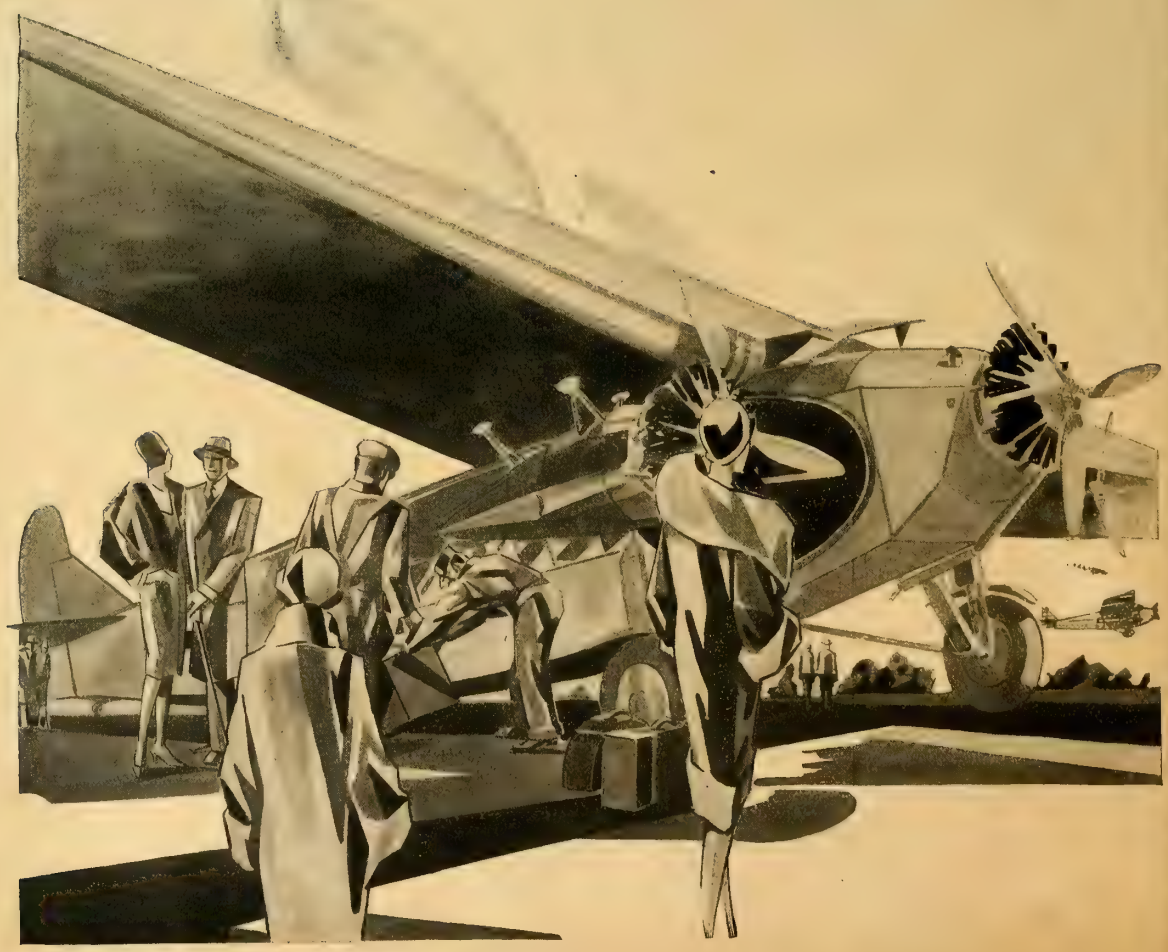
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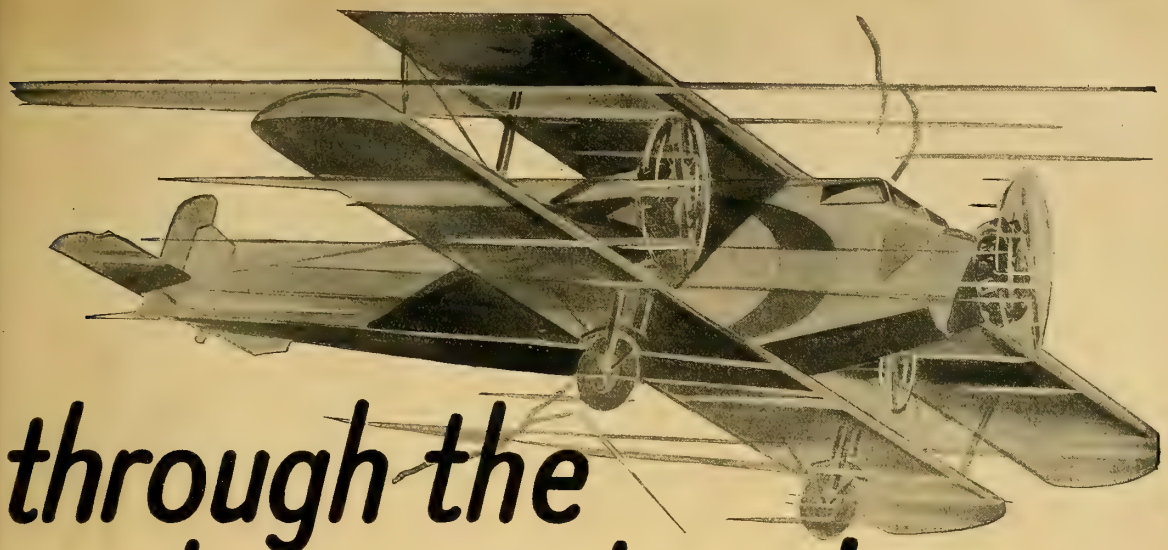
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P. & W. WHITNEY U.S.A.
DEPENDABLE ENGINES

The "open road" lies



Say you saw it in AERO DIGEST



through the charted skies!

The progress of civilization is written in terms of transportation. Commerce has walked, sat in saddles, been pulled by steam and carried on pneumatic tires as history turned succeeding pages. Still the demand for greater speed continues. Today commerce takes wings, and leaps bullet swift through the charted skies.

Boeing, Ford and Fokker trimotored transports, flying on regular schedules, and operated by several great transportation companies are making transcontinental passenger service by air an accomplished fact. These super-planes, powered by Pratt & Whitney "Wasp" and "Hornet" engines, represent the last word of science in safe and dependable air transport.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

Operators Using The "Wasp" and "Hornet"

Aero Corp. of California
Barnes and Gorst
Boeing Air Transport
Paul R. Braniff, Inc.
Canadian Trancontinental Airways
Colonial Air Transport
Compania Mexicana de Aviacion
International Airways
Interstate Air Lines
Gray Goose Air Lines
National Air Transport
National Parks Airways
Northern Aerial Minerals Explorations, Ltd.
Northwest Air Service
Northwest Airways
Pacific Air Transport
Pan-American Airways
St. Tammany Gulf Airlines
Scenic Airways
Slade Air Service
Transcontinental Air Transport
Treadwell-Yukon Company
West Coast Air Transport
Western Air Express
Western Canada Airways
Yellow Cab Airways

WESTERN NEWS

HONOLULU AIR NEWS

By Verne Hinkley

WORK has been started on the clearing of the emergency landing field on the floor of Kilauea Volcano, Island of Hawaii, an area which was rendered entirely unfit for the use of aircraft during the explosive eruptions at Halemaumau in 1924.

In years gone by the Kilauea landing field was frequently used by flights of army ships from both Luke and Wheeler Fields. It was a very hard surfaced field, almost a mile square with a slight down grade to the north, the direction from which the prevailing winds blow. All types of ships used it with ease. During the 1924 eruption, a tremendous bombardment of boulders from the throat of the volcano covered the terrain so thickly that no plane possibly could have sets its wheels down on the ground without immediately crashing. Once this crop of stone has been removed, the field will be restored at once to a flying status.

ARMY pilots made two special inter-island trips recently when a formation of 12 ships flew first to Kauai, at the northwest tip of the inhabited group, and then to Hawaii, at the southeast. Both cruises were for training and for developing use of radio control, the control station on Oahu being kept informed every 10 minutes of the change of position of the two flights into which the squadron was divided.

ANOTHER of the small group of Air Corps officers whose dream of circumnavigating the globe by air and whose tireless energy made that flight possible, has arrived for duty in the Hawaiian department. He is First Lieut. Clarence E. Crumrine, who, at the time the globe flight was being planned, was stationed at McCook Field, Ill.

Lieut. Crumrine made an exhaustive study of the needs of fuel and supplies, and submitted plans for delivering them to the planes as they made their way around the world.

Two other world circling officers are now here,—Capt. Lowell H. Smith, commander, who is stationed at Wheeler Field, and Lieut. R. J. Brown, Jr., who was in charge of arrangements for the flight, on duty at Fort Shafter.

Arriving on the same transport with Lieut. Crumrine were First Lieut. Reuben Moffat, from Wright Field, and Lieut. H. G. Montgomery, from Kelly Field.

E. H. LEWIS, Honolulu transportation man, brought to Honolulu in mid-October three airplanes with which he will inaugurate an island air service. The ships are a Monocoupe, an American Eagle and a Swallow. He will bring a Bach trimotor job to Honolulu in December, the latter ship to be used between the islands.

Lewis is also importing a pilot who, in addition to ordinary flying duties, will be an instructor in a school of aviation.

CHARLES STOFFER, Honolulu commercial pilot, is making plans for the importation of a cabin monoplane which he expects to use in sightseeing and training work, but more particularly in flights for business houses.

Hawaiian Air Notes

By Ernest Marion

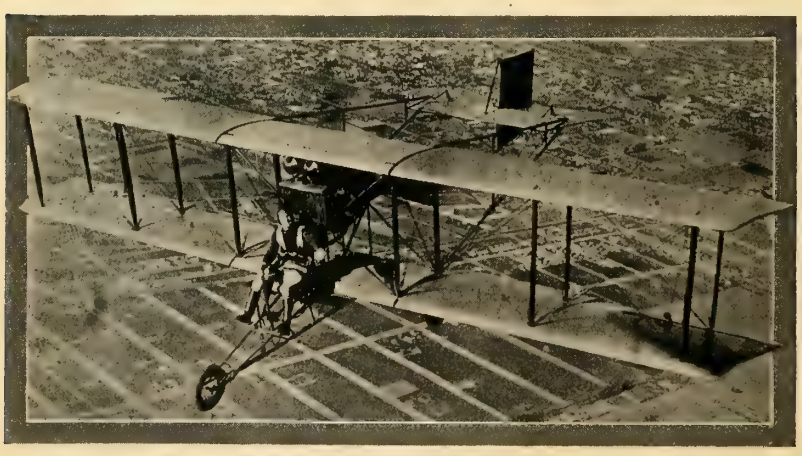
HAWAII was presented with her first aeronautical exposition Saturday, October 27, when the Naval Air Station at Pearl Harbor staged a public show in connection with the Navy Day exercises of the Pacific fleet.

On pier 5 in Honolulu, various types of aircraft used by the Navy were placed on view, with well informed attendants to explain them to the public. A feature of the exhibit was a display of wing sections, pontoon sections and fuselages showing methods of construction. The engine exhibit displayed both water and air-cooled motors of conventional Navy design.

An aerological exhibit, showing how wind velocity at various altitudes is obtained, was also explained by the Navy men. Carrier pigeons were released at various times with messages, and a pigeon expert explained their care and uses for military purposes. An aerial review over Honolulu, in which more than twenty-five Army and Navy planes took part, featured the day's program. All types of planes used in the defense of the islands were flown in the formations.

LIEUT. COLONEL JOHN H. HOWARD, chief of the U. S. Army Air Corps, Hawaiian Department; Commander Victor D. Herbster, commanding officer of the Naval Air Station at Pearl Harbor; and A. W. Van Valkenburg of Honolulu have been named as members of the aviation committee of the chamber of commerce in Hawaii.

Commander Herbster and Lieutenant Chester Clark, Air Corps Reserve, have been appointed by Governor Wallace R. Farrington as members of the territorial aeronautical commission.



Al Wilson and his Curtiss pusher type airplane.

CALIFORNIA AIR NEWS

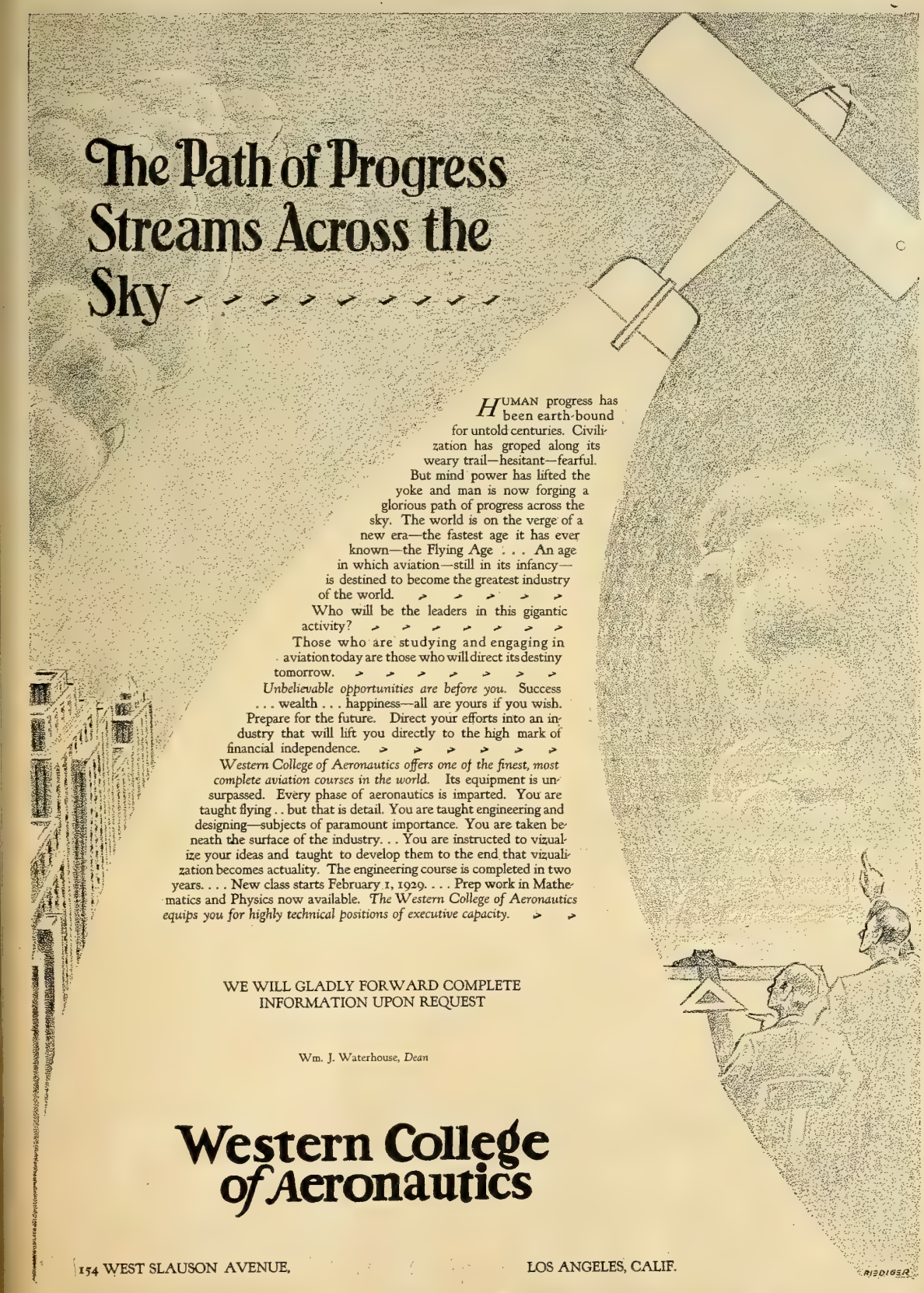
RUSSELL lobe parachutes have been much in evidence recently. During the National Air Races, Archie Atherton, noted Marine parachute jumper, used the Russell parachute in his daily exhibition jumps, and Al Wilson wore one whenever he went aloft in the old Curtiss pusher which he was piloting around Mines Field. When Jack Cope recently established a new world's free fall record of 3,400 feet, he used a lobe parachute. The Russell parachute is now being manufactured by a British company and is being distributed throughout the British dominions and Europe.

Weems Avigation Course Offered by Pacific Technical University

THROUGH arrangement with Lt. Com. P. V. H. Weems, U. S. N., the Pacific Technical University of San Diego has instituted a home study course in the Weems system of celestial navigation. The Weems system is recognized as one of the most rapid and accurate systems of marine and aeronautical navigation. It is used by Lindbergh, Byrd, Lincoln Ellsworth and other noted fliers, and has been approved by the Guggenheim Fund for the Promotion of Aeronautics and by numerous naval and governmental officials. Practical navigation problems and their solutions prepared by Lt. Com. Weems were published in recent issues of Aero Digest.

THE International Derrick and Equipment Company will soon move its general offices downtown in Los Angeles. The company manufactures hangars and various types of towers and supports for airway lighting systems. (*Cont. on next page*)

The Path of Progress Streams Across the Sky



HUMAN progress has been earth-bound for untold centuries. Civilization has groped along its weary trail—hesitant—fearful. But mind power has lifted the yoke and man is now forging a glorious path of progress across the sky. The world is on the verge of a new era—the fastest age it has ever known—the Flying Age . . . An age in which aviation—still in its infancy—is destined to become the greatest industry of the world.

Who will be the leaders in this gigantic activity?

Those who are studying and engaging in aviation today are those who will direct its destiny tomorrow.

Unbelievable opportunities are before you. Success . . . wealth . . . happiness—all are yours if you wish. Prepare for the future. Direct your efforts into an industry that will lift you directly to the high mark of financial independence.

Western College of Aeronautics offers one of the finest, most complete aviation courses in the world. Its equipment is unsurpassed. Every phase of aeronautics is imparted. You are taught flying . . but that is detail. You are taught engineering and designing—subjects of paramount importance. You are taken beneath the surface of the industry. . . You are instructed to vizualize your ideas and taught to develop them to the end that vizualization becomes actuality. The engineering course is completed in two years. . . . New class starts February 1, 1929. . . . Prep work in Mathematics and Physics now available. *The Western College of Aeronautics equips you for highly technical positions of executive capacity.*

WE WILL GLADLY FORWARD COMPLETE INFORMATION UPON REQUEST

Wm. J. Waterhouse, *Dean*

Western College of Aeronautics

154 WEST SLAUSON AVENUE, LOS ANGELES, CALIF.

(California Air News continued)

THE addition of Lieutenant Colonel R. S. Hartz to the faculty staff of the Western College of Aeronautics completes one of the most efficient groups of aeronautical instructors in the United States. He will supervise instruction work in the ground school course.

Other members of the faculty are: Carelton E. Stryker, engineering instruction; Harry H. Boore, instructor, machine shop; Lt. Leo R. McGehee, chief pilot; John C. Simpson, navigation, meteorology, air traffic rules; Alfred Livingstone, engineering, preparatory; W. J. Kirby, instructor in engines; Ray Fife, instructor in rigging; William J. Waterhouse, Dean.

THE efforts of members of the local post of the American Legion have procured one of the finest airports in Central California for Salinas. Further developments, especially the construction of a cross runway, will be undertaken soon. The American Legion members plan to make this a first class flying field.

FIRST on Lindbergh Field at San Diego, the San Diego Air Service now has two Travel air planes and all its ground facilities in service. This corporation conducts a school and offers other aviation services. The hangar has been located at the northeast side of Lindbergh Field, and the present runway passes directly in front.

"Pegasus" Engine Production

THE "Pegasus" engine is to be built in the Los Angeles plant of the Rocky Mountain Steel Products, Inc., which firm has been continuously and successfully manufacturing automotive products for the past eleven years. A well equipped building with ample floor space and suitable machinery is now available for engine manufacture. It is planned to start production soon after the first of the year. As soon as the demand warrants, a new factory building designed for quantity production of these engines will be erected.

The Rocky Mountain Steel Products, Inc., pioneered and commercialized the development of compound transmissions for automobiles and trucks, their product being known under the name of "Rocky Mountain" Four and Six Speed Transmissions. A manufacturing experience of ten years in gear cutting and grinding and precision work of this nature places them in a strategic position to carry through the successful manufacture of the "Pegasus" engine.

This concern is a closed corporation amply financed for engine manufacture. The organizer of this company, E. C. LeMunyon, is also the president and general manager. F. E. Eckhart is the vice president, C. E. Poepping, secretary and Charles F. Willard, chief engineer.

This engine was designed by Charles F. Willard, well known in both the automotive and aeronautical industries.

EARLY production of a 7-cylinder radial air-cooled engine is planned by the MacClatchie Manufacturing Company of Compton, Calif.

After severe block testing the initial motor was installed in a 3-place Wallace cabin monoplane. During the block test the motor remained very cool; the temperature never exceeding 147 degrees F. At top speed the ship has attained 140 m.p.h., level flying.

The engine is to be built at Compton and the present MacClatchie plant will be enlarged to house the extra equipment necessary to manufacture the new product. Production of about 50 motors a month is expected by February 1, 1929.

The Panther is simple in design, being of the L head type of construction, which eliminates a number of working parts and makes a more streamlined and more quiet running motor. It is very fast due to its small outside diameter of only 35 inches.

The Panther has been test flown for the past month and has made trips to Ventura, San Diego, Bakersfield and Majave. It is being put through further tests.

SACRAMENTO NOTES

By Ralph K. Clark

SACRAMENTO is to have another outlet to transcontinental air service when the Pickwick Airways begins a passenger airplane service between the Pacific Coast and Chicago about the first of the year.

The company will operate a passenger line from San Francisco to Chicago, via Los Angeles and Phoenix. The West Coast Air Transport, a subsidiary of the Pickwick Company, will operate from San Francisco, via Portland, and thence East. This arrangement provided both a northern and southern air route to the East.

The Capital Air Service, which is also owned by the Pickwick Airways, which now operates twice daily service between here and San Francisco, will meet the transcontinental planes at San Francisco for southern connections and at Corning for northern connections.



Member of High School Aero Clubs at Aero Corporation of California airport for their semi-annual flight over Los Angeles in one of the Corporation's Fokker Universals.

OAKLAND AIRPORT

FIVE new records were established at Oakland Municipal Airport during the month of October.

Boeing Air Transport carried the heaviest single load of mail, 726 pounds, from Oakland to Chicago.

Silas Morehouse, flying a Western Air Express Fokker F-10 on a regular passenger run, traveled from Oakland to Los Angeles in two hours and eight minutes, an average speed of 177 miles per hour.

Al Gilhausen of Pacific Air Transport established a new record for mail planes between Oakland and Los Angeles. His time was three hours and fifteen minutes, including stop-over time at Fresno and Bakersfield.

Oakland Municipal Airport played host to the greatest number of airplanes in its history, 75 ships are now quartered regularly at the field.

For the first ten months of this year, the airport figures are as follows: landings, 56,330; passengers carried, 35,572; student flights, 7,335 and gross revenue $27,372.25. Because of increased demand for space, a fifth hangar is to be constructed at Oakland Municipal Airport.

D. C. WARREN, Oakland Municipal Airport Travel Air representative, reports that he sold more than $50,000 worth of ships during the month of October.

DILLARD HAMILTON, Department of Commerce inspector, has been assigned to duty at Oakland airport.

SAN FRANCISCO NEWS

By E. J. Carnes

ALTHOUGH a gigantic air show drew thousands of interested spectators to Mills Field, and the attention of other thousands was called to aviation by an aerial parade and "bombing attack" on the city, San Franciscans failed to rally 'round at the polls on November 6, and the $1,700,000 bond issue for improvement and enlargement of Mills Field failed to pass.

THE Aeromotive Engineering Company of America has tendered to Oakland Airport a proposal to establish a "superservice air station" on that field. The company plans a chain of these stations, providing supplies and service for fliers. Lieutenant George O. Noville, of transatlantic fame, is said to be one of the directors.

Lieutenant Noville is head of the newly formed Marchetti Motor Patents. The Marchetti outfit has purchased a tract of land near Mills Field, where they intend to erect a factory for the manufacture of the new Marchetti crankless aviation motor and a new type of plane.

THE California Glider Club has been formed in San Francisco by Charles Ferguson, well known clubman and chairman of the Gliding and Soaring Flight committee of the local chapter of the N. A. A. He plans to build the first German motorless plane here and enter it in the national glider competition next summer.

AIR SERVICE TRAINING





AIR SERVICE TRAINING offers not only a curriculum of military exactness but the finest of aeronautical equipment used in any civilian school of aviation. ¶ Aircraft of acknowledged leadership, Travel Air training planes powered with Warner Scarab engines, are used exclusively in primary flight training. Army and Navy experience showing the efficiency of standardization upon one type of primary training plane has been drawn upon in selecting the best of modern aircraft for the initial instruction of student pilots. These planes and engines of outstanding merit, flown under the direction of skilled Transport Pilot instructors, definitely contribute to the superiority of *Air Service Training*. ¶ Machinery and equipment sufficient for the entire construction of complete airplanes assures the technical skill of *Air Service* graduates in the maintenance of modern aircraft. A special department for engine overhaul instruction gives thorough training in the repair of water and air cooled engines. ¶ Send the coupon today for complete information about *Air Service Training*. You will enjoy reading of the complete facilities for aeronautical training available at Lindbergh Field in the Air Capital of the West.

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CONTACTS

By Frank E. Samuels

DURING my rounds I am always surprised at the many changes and improvements in all branches of the aviation industry on the West Coast. A notable improvement just completed is the expansion of the Crawford Airplane Supply Corporation of Venice. Having just completed a new fire-proof building, with a floor space of 100' x 150', they are now nicely settled in their new quarters. Mr. Kennedy, general manager, took me through the plant, pointing out the large offices, fire-proof cabinets and cases for parts and supplies, the machine shop and repair department. The company has lately taken the agency of the Flottorp propellers, Murphy varnishes and Wood shock cord, and is opening a branch at the Municipal Airport at Long Beach. W. D. Hintze, sales manager, informs me that they are making shipments to all parts of the world, including China, where they are making monthly shipments.

HERE is an innovation that we believe will be followed by every large city in the country, and should do a lot to encourage the public in becoming air-minded. The Tanner Auto Tours, our largest operators of sightseeing busses, have started a connecting air sightseeing line, known as the Tanner Air Livery, located at Clover Field, Santa Monica. Their busses connect with the airline, and the passengers are privileged to enjoy a trip in one of their Stinson-Detroiter cabin planes. The Tanner company has the California agency for these planes. A large percentage of the bus passengers take advantage of the air flight.

ANOTHER new company is Flying, Incorporated, situated at Culver City and occupying the flying field lately purchased by them from Bob Blair, formerly known as the Pacific Buhl Airport. The company consists of William G. McAdoo, Jr., lieutenant naval aviator in the World War, A. E. McManus, Jr., late of the Royal Air Force, and Lansing Pedis, a San Francisco pioneer pilot. Harry Ashe is chief pilot. Flying, Incorporated, holds a Buhl dealership as well as a dealership for the Monocoupe. It is the intention of the company to give all instruction in Monocoupes, claiming that the student's sitting beside the instructor in a cabin plane, where it is possible for them to converse, will benefit the student. New hangars are being built and a number of improvements being made, including a new office building and entrance arch.

WILLIAM S. BELT, formerly a wire service foreign correspondent and more recently an executive in the hotel and transportation fields, has been engaged by J. L. Maddux, president of Maddux Air Lines, to act as assistant general manager of the airways system. He will have supervision over both the traffic and operating departments under Mr. Maddux. The Maddux system at this time operates eight trimotored Ford airliners, besides a number of smaller planes, and reports the largest volume of business since the inception of the airline.

THE Reliable Transfer, Taxi, and Storage Company of Ketchikan, Alaska, will operate a passenger, freight and express airline over its already established land route in southeastern Alaska. According to J. V. Hickey, president and general manager of this company, who is now learning to fly and studying airline operations at the Aero Corporation of California, the new service will start early next spring. It will offer the many tourists to Alaska air transportation between Ketchikan, Guneo, Petersburg, Wrangell, Hyder and Prince of Wales Island. This company, which is the largest company of its kind in the North, will operate the first airline in southeastern Alaska.

AT the last regular meeting of the California Aircraft Operators Assn., the association went on record as endorsing immediate action on the part of the City Council of Los Angeles in the establishment of a municipal airport at Griffith Park. The present field there is used by the California National Guard and is suitable for an airport. The field, being close to the city, should be used simply as a terminal for air transport lines. At the same meeting, it was decided to urge the special aircraft committee of the Railroad Commission, appointed some weeks ago, to take only such action at this time as would enforce the rules and regulations of the Aviation Branch of the Department of Commerce. It was urged further that any further measures for additional regulation be postponed for a period of at least twelve months, allowing sufficient time to show the need of further legislation, which at this time might prove detrimental to the industry. They also decided to recommend similar action to any counties, municipalities or other communities contemplating regulation of aircraft at this time. The point was made that the Air Commerce Regulations of the Department of Commerce provide for safe, sane flying, and were prepared after exhaustive study and competent and expert analysis of all phases of present aviation activities.

DUDLEY M. STEELE, head of the Richfield Oil Company's aviation department and chairman of the contest committee of the recent National Air Races, has made arrangements with American Aircraft to house the new Stearman biplane that is being added to the fleet of planes operated by Richfield company at American Airport, Los Angeles. The new Stearman will be especially equipped for cross-country flying and for experimental work.

DROPPING into the R. O. Bone Company's plant at Inglewood, where the Golden Eagle plane is built, we were surprised to find a line of five of the little sport planes on the floor in different stages of construction, as the company has only been in the quarters since the latter part of September. Mark Campbell, who has charge of construction, took us through the plant and showed us how rigidly the little planes are built and, after having seen one perform at the Santa Maria Air Meet, we feel certain that the R. O. Bone Company has something to be proud of.

NOTICING a very handsome Buhl Airsedan with a Pratt and Whitney Wasp motor at the Rogers Airport, Jim Webster informed us that it was the property of W. A. Clark, 3rd, third descendant of the famous W. A. Clark of Montana. Jim introduced us to Mr. Clark's pilot, H. J. "Jack" Lynch, one of our best known Western pilots, who informed us that three or four times a month he flies Mr. Clark from his home at Butte, Montana, to Los Angeles—1,200 miles.

THE first of the Bach Air Transports, built for the Pickwick Air and Stage Line for its transcontinental route, is nearly complete, and it is surely a wonderful airplane. Finished inside as luxuriously as a private yacht and with its Pratt and Whitney and two Comet motors, it will set a pace that will surprise even the most blasé air traveler.

STANLEY SHORT has just taken delivery of one of the new model Eaglerocks from the Aero Corporation of California. It will be used for training students at the Short's Airport.

THE Long Beach Flying Club, which is composed of twenty-five prominent Long Beach business men who have organized for the purpose of learning to fly, has purchased its second Eaglerock, also from the Aero Corporation. The new plane will be used for instructing the club members under the able supervision of R. L. Seydel, chief instructor.

BOB BLAIR has been engaged by the First National Film Corporation as technical supervisor of the company's aircraft division.

THE Mutual Aircraft is building a concrete hangar and shops at Clover Field, and as soon as it is completed, will move its activities to this new home.

AMERICAN AIRCRAFT reports the sale of four Wacos during the past week, and indicates that business is enjoying a healthy and steady improvement day by day.

JOE'S LUNCH ROOM at the Master Aircraft flying field, known as Joe's Rudder Bar, has become so popular that it is almost impossible to find a seat at any time. And well it should, as Josephine is a loyal friend to all the pilots, and since she takes personal charge of the kitchen, the boys all know where to secure the best of fuel for their inner man. (This is not an advertisement for the place but an appreciation of the many kind acts that Joe performs for the pilots, not only of California, but all visiting pilots.)

LEARN TO FLY WITH

RYAN

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It means something to be a Ryan Graduate. Ryan graduates are real pilots. Real pilots are in demand.

It is a widely recognized fact—RYAN STUDENTS ARE BETTER TRAINED! Ryan graduates, by virtue of their long, thoro training with complete equipment under competent instructors, are better qualified to fill the important flying and executive positions which are opening up on every hand.

Winter Classes Now Enrolling

No delays, no inconveniences. Every day is a flying day in San Diego! No winter—no sleet, slush and snow—no freezing temperatures—no high winds or storms. That's why U. S. Government flying activities are centered here, and why 42 world's records in aviation have been broken here.

NOTE:

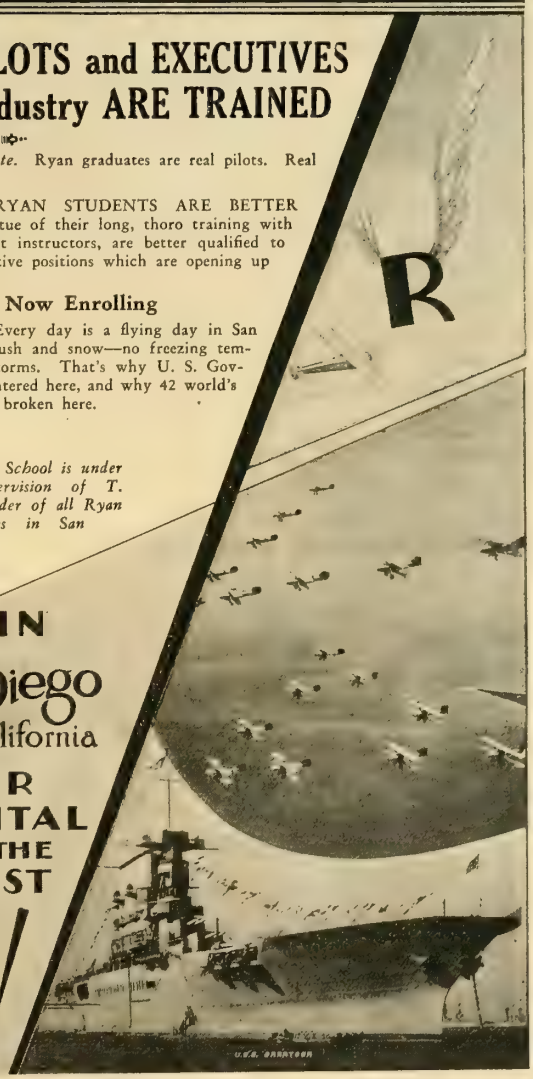
T. C. Ryan Flying School is under the personal supervision of T. Claude Ryan, founder of all Ryan Aviation Activities in San Diego.







IN San Diego California AIR CAPITAL OF THE WEST !



THIS COUPON WILL BRING YOU AN INTERESTING CATALOG

The T. C. Ryan School specializes in a complete course covering four full months—with 60 hours in the air and thoro ground training—qualifying you for a limited Commercial License.

Also a Private Operator's course, covering two months—with 20 hours in the air and primary ground training. Also *Advanced Work* for those who have had previous training.

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Gentlemen: I am interested in your course of flying instruction. Please send me your catalog.

Age.....

Name ..... Address .....

Say you saw it in AERO DIGEST

THE LOS ANGELES METROPOLITAN AIRPORT

By C. T. Ketcham

LOS ANGELES has provided an airport of permanence for the aircraft industry —the Los Angeles Metropolitan Airport. Financed by private capital, it has been created in sixty days. It is controlled by owners of hangar sites, lease holders, owners of manufacturing sites, and school operators.

The airport is located in the geographical center of the San Fernando Valley to the north of Hollywood. Saticoy and Woodley boulevards intersect at the southeastern corner of the field. It is a forty-five minutes' drive on paved road to the Los Angeles business center and twenty-two to Hollywood. The field is almost square and 381 acres in extent. Cross runways, 1,000 feet wide and 4,000 feet long, provide 180 acres of landing area. They are hard and smooth regardless of weather; in time the runways will be green sod.

The whole project has been designed by an aeronautical man—Waldo D. Waterman. Everything has been considered from the viewpoint of utility for the aircraft industry without losing sight of the comforts of the public patrons. In the completed plans, provisions are made for a semi-public flying club, a transient hotel, central waiting depot, public rest-room facilities, automobile parking areas, and similar conveniences.

Ultimate total investment at this center of the aircraft industry, it is expected, will exceed $10,000,000 in land and improvements. At present, after two months of construction work, a night beacon of 12,000,000 candle power, a ceiling light and B. B. T. floodlight are in operation. One steel and concrete hangar completely equipped and housing four trimotor transports is in use by the Maddux Company, operators of Ford trimotor passenger planes between San Francisco and Agua Caliente, Mexico. The first unit of a model service station for aircraft has been completed by the Richfield Oil Company. A dispatcher's tower, capped by a Crouse-Hinds beacon, is completed and in its five stories contains registration, weather charts, radio and executive offices. Work is well advanced on the first $50,000 unit of the Bach Aircraft Company's factory, and many building permits for the construction of hangars, shops, and service facilities are pending.

Runways and service facilities are ready and visiting fliers are cordially invited to use the Metropolitan Airport at Los Angeles. A proper dedication cermony is planned for early in the new year.

Completion of the airport will stand as a mark of achievement to Mr. Waterman, but it is not in any such spirit that he daily strives to rush the progress of what now has become recognized as Southern California's major airport development. Rather, it is the desire to complete a property that will adequately fulfill the needs of this great air industry.

NEW MADDUX AIR LINE SCHEDULE

TO allow more time at destinations for pleasure and business, Maddux Air Lines have changed their schedule to make an earlier departure in the mornings from San Francisco and Los Angeles.

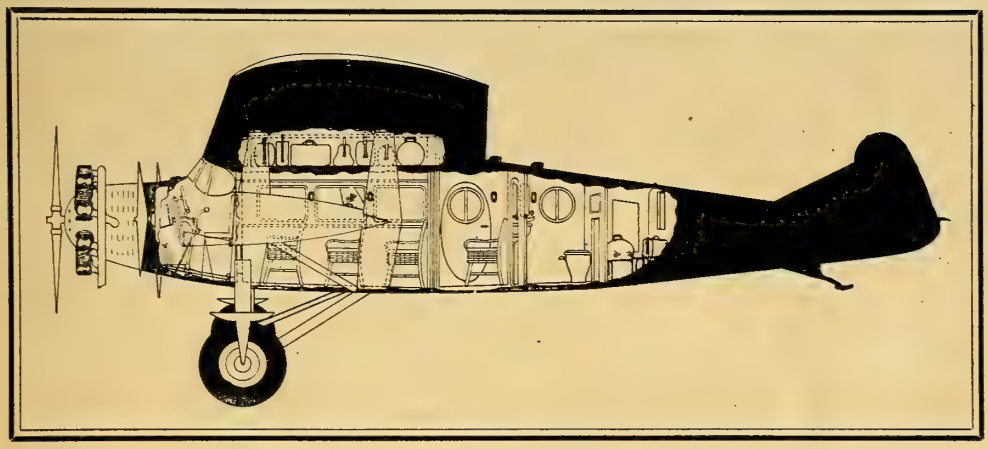
The northbound plane from Los Angeles now departs from Rogers Airport at 8:00 a. m. for Bakersfield, Visalia, Fresno, Oakland and San Francisco. The time of arrivals are: Bakersfield, 9:10 a. m., Visalia, 10:00 a. m., Fresno, arrive 10:25 a.m., depart 10:40 a. m., San Francisco and Oakland, 12:30 p. m. Both Mills Field and Alameda airport are used at the northern terminal.

On the Los Angeles-San Diego-Mexico division, the daily plane departs southbound at 8:15 a. m., stopping on reservation at Long Beach at 8:35, Santa Ana at 8:45, and arriving at San Diego at 9:30 a. m. Departing from San Diego at 9:35 a. m., it will arrive at Agua Calienta, Mexico, at 9:55 a. m. On Wednesdays, Saturdays and Sundays the plane will leave Agua Caliente at 10:10 a. m., arriving at Ensenada, Mexico, at 10:45 a. m.

On the northern division, southbound planes depart at 8:00 a. m. from San Francisco, arriving in Los Angeles at 12:30 p. m. On the southern division, schedules remain as at present, northbound, leaving Ensenada at 3:25 p.m., Agua Caliente at 4:15 p. m. and San Diego at 4:45 p. m., allowing liberal time for customs, and arriving at Los Angeles at 6:00 p. m.



BACH



BACH TEN PLACE TRANSPORT

Available after first of year with five different motor combinations.

BACH AIRCRAFT COMPANY

Clover Field Santa Monica

California

Say you saw it in AERO DIGEST



Grand Canyon Airport, an oasis for fliers.

ARIZONA AIR NEWS

By Harold G. Wilson

FLORENCE is to have a municipal air field, located two miles south of the city, adjoining the state highway. The tract comprises 320 acres, and 320 adjoining acres are being sought as an addition to the field.

THREE aviation companies operating in the West and Southwest were merged early in November, including the Scenic Airways, Inc., which operates with Phoenix as a base. Other companies involved in the merger are the Gray Goose Company, of Chicago, which operates sightseeing service about that city, and the Interstate Airways, also of Chicago, which operates a passenger airline between Chicago and Evansville, Ind. This latter line will soon be extended to Atlanta, according to Lawrence W. Scudder, president of the new firm, which is to be known as the United States Aviation Corporation. Kirke T. Moore, chairman of the Arizona aviation committee, will have charge of the Arizona operations of the new company. A $150,000 airport at Phoenix and another base field at El Paso will be used for the company's operations in the Southwest.

AIR commerce regulations to govern the operation of aircraft as common carriers in the state have been adopted by the Arizona Corporation Commission. The new rules became effective November 10, the date of their adoption, and do not conflict with interstate regulations. Under the new code, all airlines operating in the state must now receive a permit from the commission. Planes operated as private conveyances for pleasure do not come under the new regulations.

GOOD progress in the development of the international airport at Douglas is reported by J. "Pat" White, chairman of the chamber of commerce aviation committee. A total of 460 acres is to be cleared immediately on the northern side of the international boundary, which will be matched by a similar tract on the southern side of the boundary, to be developed by Aqua Prieta, Sonora, Mexico. General Electric floodlights, boundary, beacon and ceiling lights have been ordered and will soon be installed.

CHARLES Mayse, president of the Mayse Air School, Tucson, was the successful bidder for the aviation work at the Arizona State Fair, held in Phoenix during November. With him at the fair was Ted O. Penny, wing walker and professional parachute jumper, who added thrills to the flights.

A HAMILTON all-metal plane has been added to the fleet of planes being operated in the state by the Scenic Airways, Inc. Delivery of the plane was made at Phoenix early in November.

A FORMER air mail pilot, H. M. O'Toole, has been named instructor for the Southwest Air Service, with headquarters in Tucson, it was announced recently by Harold Durham, secretary-treasurer of the company.

IN the September issue of AERO DIGEST, mention was made of a landing field midway between Globe and Miami. Subsequent reports state that the field is very poor—not fit for a forced landing. There is, however, a temporary field seven miles south of Globe, by the Southern Pacific tracks. Business men of that vicinity are endeavoring to have this field developed into a permanent airport.

Scenic Airways Activities Increasing

THE Scenic Airways, Inc., operating at Grand Canyon, bids fair to become one of the largest companies in the United States doing "pleasure hopping."

This company, headed by J. Parker Van Zandt, is operating two trimotor Fords and one Ryan at the Canyon Airport, which is an oasis in an aviation desert. This airport has all modern machine facilities and an excellent hangar. Although the field is 6,400 feet above sea level, it is large enough for any commercial ship. It lies 15 miles south of the El Tovar Hotel, and can be distinguished from the air by the natural landmark of Red Butte Mountain, a high peak which is visible in any direction for 75 miles on a clear day rising directly out of a huge plateau. The terrain is excellent, and the field is provided with three solid and smooth runways. The northeast and southwest runway, which is generally used, is 6,500 feet long with practically no obstructions, and is 1,800 feet wide. In addition there are two other 4,000-foot runways which may be used for cross-winds. Three well known pilots who are stationed at the field are La Marr Nelson, Paul Scott and D. W. Burford, all experienced trimotor and transport pilots.

The Scenic Airways has inaugurated a new as well as novel service which it finds is not only popular but a well paying proposition. For fifty-eight dollars, a deer hunter will be carried 95 miles back into the forests to Fredonia, which is 135 miles from a railroad, and put into the hands of a guide who guarantees a buck with any amount of prongs. If the hunter is such a rotten shot, he is advised to just take a club or use a rock. The deer parties generally consist of six men, and each is allowed to bring his buck back in the plane. The little settlement of Fredonia was quick to realize the possibilities of aviation and has cleared a fine field for the above purpose.

The main service of the company, however, is making flights over the canyon. A charge of $12.50 is made for this flight, which includes transportation to and from the field. Although the company had a late start this year, it has carried more than 2,000 passengers over the canyon.

Scenic Airways also operates the airport at Albuquerque, New Mexico, and has one Wasp Hamilton and one Hisso Travel Air there. At Phoenix the company has purchased an excellent field site and will be operating there in the very near future, doing cross-country, instruction, photography and general air work. A number of Fairchilds and light training ships will be stationed at this field.

MONTANA AIR NEWS

By C. T. Sullivan

POLITICS took wings in Montana in the last hectic few weeks prior to the November election. J. W. Schnitzler, Montana's flying state senator and Republican committeeman, managed with the aid of a Monocoupe, to be in the thick of politics in different sections of the state. The plane was purchased through the Vance Air Service. Titus Richards piloted the senator's plane.

The *Montana Free Press*, newspaper of Butte, served its subscribers in Helena, Cascade and Great Falls with news fresh from the press by contracting with the Butte Aircraft Corporation to land papers at Helena, drop them at Cascade and land them at Great Falls. A Lincoln-Page biplane is used in making the 130-mile trip from Butte to Helena, Cascade and Great Falls.

HAVRE'S airport, Montana's northermost airport, is being improved by the chamber of commerce of that city.

THE Vance Air Service of Great Falls has postponed the opening of its passenger air line to Billings until January 1. Intermediate landings on the 200-mile run will be made at Stanford, Harlowton and Lewiston.

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WATCH FOR FURTHER ANNOUNCEMENTS

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CHAMBER OF COMMERCE BUILDING
LOS ANGELES, CALIFORNIA

UTAH AIR NEWS

By Glen Perrins

VARNEY AIR LINES, INC., announce an expansion program involving $100,000 for additional planes to be used on the Salt Lake-Pasco route. A steady increase in the volume of mail carried between the two points has made it necessary to equip the line with larger planes.

Pasco is installing boundary lights on its newly purchased municipal airport, and other cities along the route are planning expansion programs for their fields.

NEW air mail planes capable of 140 miles an hour will be placed in operation soon on the transcontinental air mail route and trimotored 18-passenger transports will be in operation by next summer, says Edward Hubbard, vice president of the Boeing Air Transport, Inc.

AN additional 80 acres of land at the northeast corner of the Salt Lake City municipal airport gives the city an airport one mile by half a mile in a single rectangular lot.

WITH ground broken for a new $40,000 hangar at Salt Lake City airport, and with an $800,000 investment in ten new 12-passenger trimotored Fokker monoplanes, the Western Air Express company will begin daily passenger service between Salt Lake and Los Angeles early in November.

NATIONAL AIRPORT EXECUTIVE ASSN.

A NATIONAL AIRPORT EXECUTIVES' ASSOCIATION was officially formed at a meeting held in Los Angeles September 15, 1928, for the purpose of developing plans to promote the adoption and application of higher business and professional standards in connection with the operation, management, maintenance and controlling of public and private airports throughout the United States, to disseminate information concerning airport problems internationally, to develop by precept and example a more intelligent and aggressive attitude toward aviation problems.

The governing body of the association consists of the board of trustees and the officers of the corporation. The trustees are also the governors of geographical districts of the United States and Alaska.

The annual meeting or convention of the association will be held once each calendar year at the same time and place as fixed by the holding of the National Air Races of the United States. However, another meeting will be held in Chicago during the Aeronautical Chamber of Commerce Exposition, December 5, to discuss further business of the association.

The officers of the National Airport Executives' Association are: E. A. Johnston, Dayton, Ohio, president; C. T. Ludington, Philadelphia, Pa., C. P. Neuhause, Houston, Texas, and J. V. Hyde of Seattle, Wash., vice presidents; W. G. Fuller of Fort Worth, Texas, secretary and treasurer.

The trustees, who are also the governors of the geographical district and compose the executive board, are as follows: Gordon Hood, Syracuse, New York, Eastern district; G. N. Southwick, Atascadero, Calif., Western district; Seeley V. Hall, Medford, Ore., Northwest district; G. G. Geng, St. Paul, Minn., Northeast district; J. Wayne Parks, San Antonio, Texas, Southwestern district.

COLORADO AIR NEWS

MOVING pictures of Pikes Peak and surrounding scenery were taken by an Alexander cameraman in an Eaglerock airplane powered with Hisso A motor, September 22. Piloted by Ted Haueter, assistant sales manager of the Alexander Aircraft Company, the ship crossed the summit at an altitude of 18,000 feet. Five hundred feet of film were taken for screening in theatres this winter.

SALE OF ENGINES

ON December 20, 1928, at 10 a. m., 14 Wright E-2 engines, 30 high compression Liberty engines, 480 gallons of clear acetate dope, 1 Chevrolet truck and 1 Ford truck will be sold at the Naval Air Station, North Island, San Diego, Calif., to the highest bidder. This material can be inspected at the Air Station before purchasing.

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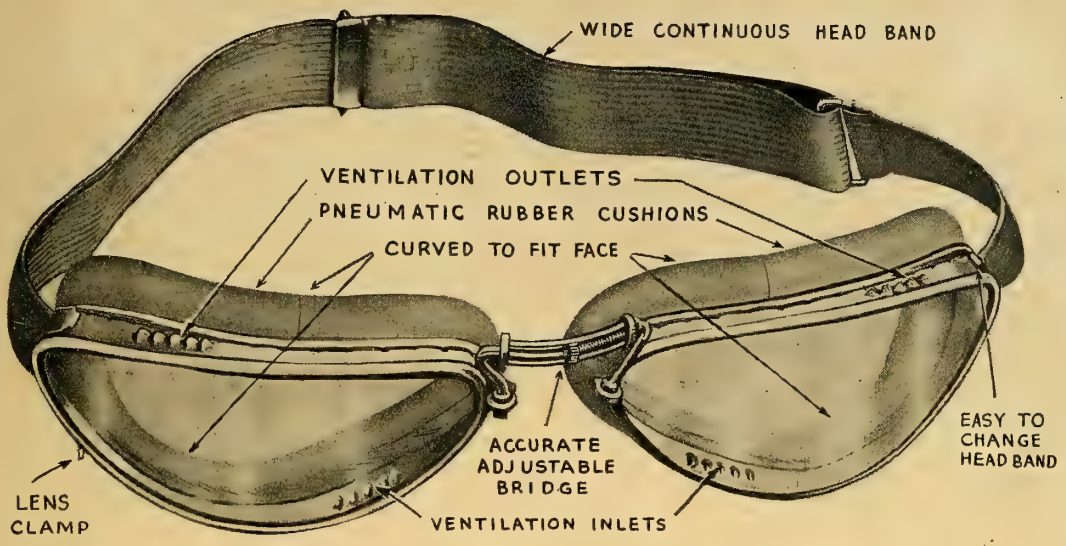
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NORTHWEST AIR NEWS

By F. K. Haskell

THE Aero Club of Oregon has a new colleague in the Portland Women's Flying Club. Twenty-five Portland women have formed the organization. Mrs. Edna Christofferson, widow of Silas Christofferson, one of Oregon's pioneer pilots, is president. Maude Wright was named vice president and Ethel M. Bissner, secretary-treasurer.

THE emergency landing field at LaGrande, Ore., is now nearing completion, and others will soon be opened at Durkee and Weiser. These three fields are on the Boise-Pasco air mail route.

IMPROVEMENT work is progressing at top speed on Swan Island, Portland's municipal airport. Four large hangars are up, one runway is laid, and three others are being laid; bids are shortly to be opened for an extensive lighting system for the field. Approximately 225 acres have been seeded, and a broad roadway completed.

More hard surface paving has been done on Swan Island than any other airport on the Pacific Coast, according to James H. Polhemus, general manager of the Port of Portland. Approximately 16,000 square yards of concrete already are in and additional yardage planned.

"AIR AGRICULTURE" or "sky seeding" is now a success in Oregon, particularly in the section around Marcola, in Linn County. This form of farming, made possible by the coöperation of the Hobi Airways, Inc., has been adopted by H. J. Downing and his two sons, who operate several thousand acres of cut-over land near Wendling.

The actual seeding was done by Major G. H. Eckerson, pilot and flying instructor, who used a Travel Air plane to carry between 200 and 300 pounds of seed on each trip, depending upon the elevation flown. The swath is between two and three miles long. A total of 4,000 pounds of seed of five different varieties was sown. Prior to the air transportation plan, sowing grass seed in this area had been a real problem.

OREGON AIR NEWS

By Harry Steinfeld

THE Varney Airlines and the Pacific Air Transport company coöperated early in November in the presentation of an interesting air mail display and exhibition at the International Livestock exposition in Portland.

FRANK W. TUCKER has been appointed assistant manager of the West Coast Air Transport company. The new executive will make his offices in Portland.

The company is contemplating inaugurating next spring an air passenger and freight line from Seattle to cities along the Alaskan coast, utilizing flying boats. Their present equipment consists exclusively of trimotored Bach air yachts.

The West Coast company has contracted with the United Parcel Service of America, operating along the Pacific Coast, as air express agent for all cities its ships touch. The contract becomes effective January 1, 1929.

THE Veterans of Foreign Wars staged a night-bombing exhibition over the Rankin airport on Armistice night. A vast throng of spectators witnessed the brilliant display of airplane pyrotechnics.

QUANTITY production of two types of airplanes will be begun early in 1929 by the Rankin System, Inc., an organization distributing internationally the system of flying training perfected by J. G. "Tex" Rankin. According to announcement by Jay Kegerreis, president, the ships will be low-wing monoplanes of two- and three-place design; the smaller to be powered with a LeBlond motor of 60 horsepower, and the larger with a similar type engine of 90 horsepower. The two-place ship will be primarily a training plane. The larger ship will be adaptable either to sport or commercial purposes. In flight it will be convertible from an open to a closed cabin job.

A factory site has been selected close to Portland.

(*Continued on next page*)

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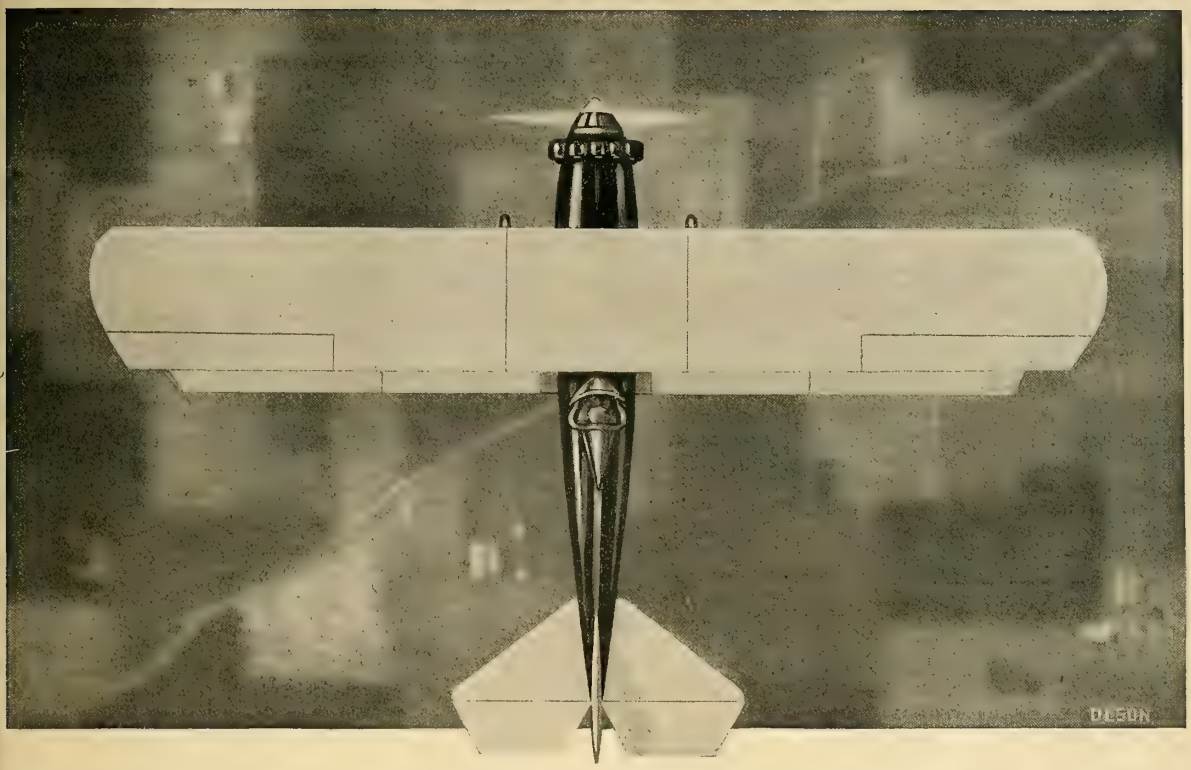
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Should you be unable to attend the show, communicate with your nearby distributor listed here. He will be glad to explain the Eaglerock sales organization to you.

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N. C., Vir., & L. C.—Charles Flying Service, Box 44, North Side, Richmond, Va.
S. Ida.—Lionel Dean, Twin Falls
S. Iowa—Dodson Aircraft Co., 512 S. Cottage Grove, Kirksville, Mo.
Wis.—Hall Aircraft Corp., 101 Scott St., Wausau
N. E. Ind. & W. Ohio—Indiana-Ohio Aero Corp., 203 Carroll Bldg., Ft. Wayne
E. Wash. & N. Idaho—Inland Eaglerock Aircraft Co., Greenacres, Wash.
Ind.—Ray Kuhl, Y. M. C. A., South Bend
Mich.—Kysor Eaglerock Co., Niles
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Ala.—Major Aircraft Co., 712 Chandler Bldg., Atlanta
Me., N. H., Vt., R. I., Conn., Mass., & Prov. of Quebec—Massachusetts Airways Corp., 1597 Main St., Springfield, Mass.
Alaska—Meals Eaglerock Sales Co., Valdez
Minn.—Minnesota Aircraft Co., 406 6th Ave., Minneapolis
W. Penn., & N. Ohio—Morris Flying Service, Municipal Airport, Aspinwall, Pittsburgh
N. Ill.—Jack Oates, Inc., 5101 W. Madison, Chicago
Ore.—Oregon Eaglerock Sales Co., 439 E. 46th St., N., Portland
N. Iowa—Pioneer Flyers, Inc., 24 Second St., N. E., Mason City
N. & S. Dak.—Rapid Air Lines, Inc., 1st Nat'l Bank Bldg., Rapid City
Fla.—Raymond Aircraft Co., Haldeman-Elder Airport, Lakeland
Nev.—Francis A. Riordon Flying School, Ely
Utah—Rocky Mountain Flying Service, 125 E. 1st So. St., Salt Lake City
Md. & E. Penn.—E. W. Robertson Aircraft Sales, Rt. 5, Alexandria, Va.
W. Va. & E. Ohio—Lyle H. Scott, 328 2nd St., Marietta, Ohio
Miss.—Sellers Motor Co., Box 622, Jackson
Okla. & Tex.—Panhandle-Southwest Airways, Corp., R 5, Oklahoma City
N. J.—Sulzberger Aircraft Sales Corp., c/o Kresge Dept. Store, Newark
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S. Ill. & E. Mo.—Von Hoffmann Aircraft Co., 105 S. 9th St., St. Louis, Mo.
W. Wash.—Washington Aeronautical Corp., 768 Commerce St., Tacoma.
N. Tex.—Wichita Falls Air Transport Co., Inc. 1202 Staley Bldg., Wichita Falls
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OREGON NOTES

By C. K. Logan

ALBANY approved a $25,000 bond issue for a municipal airport at the general election, by a majority of three to one. Several sites are available, but one has not been selected. A temporary field with no markers is being maintained just outside the city limits, near the Pacific highway.

WITH the dedication of an airport late in September, a group of Corvallis business men has purchased a Swallow biplane, erected a hangar and obtained the services of Capt. Chamberlain as pilot and instructor.

LEE EYERLY has obtained controlling interest in the Pacific Airplane Service at Salem, taking over stock held by J. E. Fitzgerald. A new hangar unit has been erected and will be used temporarily for the construction of a new type cabin monoplane.

WASHINGTON AIR NEWS

By C. M. Littlejohn

TACOMA AIRWAY, INC., is a new corporation to establish headquarters at Tacoma. Incorporators are: L. M. Isbell, Hugo Peterson, Karlos B. Adams, R. Kichtenwalter and C. R. Bowlin.

CENTRALIA AIRWAYS, INC., is a new flying school established at Centralia by Tex Rankin, head of the Rankin schools in Portland.

THE Davis Aeroplane Safety Control Company was recently established at Seattle by M. C. Davis, W. H. Cook and George Olson, and will specialize on an appliance designed to make flying safer.

WITH a new international passenger flying service to be started February first between Vancouver, Victoria, and Seattle, the British Columbia Airways, Ltd., of which K. C. Leylander is manager, is to purchase three transport planes for this new service, and for a service to be established later between Vancouver, Nanaimo and Victoria.

THE Aviator Operators Association, an organization formed recently in Seattle, held its first election and selected E. M. Greenwood as president; C. Hayes, vice president; Kenneth C. Benfer, secretary; and Harry Snodgrass, treasurer.

THE Floyd Air Service has been organized at Seattle with L. E. Erickson as president; J. H. Griffin, vice president; and George A. Wiswell and T. E. Durland, directors. This air service, which is to begin about February 1st, will establish a daily service with Ford trimotor planes from Seattle to Spokane, stopping each way at Pasco.

AT Seattle on November 6th, the bond vote was passed so that an issue of $400,000 worth of bonds will be floated to add to and further develop the Boeing Airport. Work is expected to start immediately on the airport.

THE dedication of the Fancher memorial beacon, in memory of the late Major John T. Fancher, commander of the 41st division air service unit, Washington National Guard, was held November 11 at Felts Field, Spokane airport.

The beacon, of 10,000,000 candlepower, occupying a pedestal 70 feet high at the crest of a hill north of the field, was built at a cost of $7,500 through the efforts of the Spokane post of the American Legion.

TWO new Boeing "40-C" mail, express and passenger planes are under construction at the factory of the Boeing Airplane Company in Seattle, to go on the Seattle-Los Angeles route of the Pacific Air Transport.

The new planes will be delivered about December 1, and will be used to handle the increase in volume of traffic due to Christmas mailing.

A FLEET of 25 Boeing all-mail planes, to be operated by Boeing Air Transport on the San Francisco and Oakland-Chicago transcontinental route, is nearing completion. Describing the new design, which is known as "95", P. G. Johnson, president of the Boeing organization, said that it will have a wing spread of 44 feet and 3 inches; lower wing, 39 feet and 6 inches.

There are three cockpits for mail and one for express, all forward of the pilot's pit. High speed with full load is 140 miles per hour, landing speed 53 miles per hour. The

(Continued on next page)

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(*Washington Air News continued*)

distance required for take-off is 525 feet; time, ten seconds. Rate of climb is 1,025 feet per minute. Motor equipment is the Pratt and Whitney Hornet of 525 horsepower.

STAR AIR LINE, INC., of Seattle, plans to build a plant in Georgetown, the industrial community of Seattle, for the manufacture of planes. John R. Allen is sales manager of the company. J. Harry Snodgrass is its president.

TWIN-CITIES AIR SERVICE has been organized at Longview for the purpose of offering flying instruction in that vicinity. Plans for the purchase of a plane are nearly complete. A flying field has been procured and will be developed soon. The officers are: P. R. McLaughlin, president; G. A. Ward, secretary; A. Amadon, treasurer; and A. W. Martin, chief pilot and general manager.

IDAHO AIR NEWS

By Ida M. Durnin

SO that reserve officers of the United States Army may become thoroughly schooled in the methods of modern warfare, daily classes are held at the state house in Boise, under the supervision of Col. Charles Leonard, instructor.

Although listed as a reserve officer's school, the classes are open to all men, but they are especially designed to give training to the officers during the reserve corps' inactive period.

Classes are also held in Moscow, Lewiston, Nampa, St. Anthony, Pocatello, Twin Falls and Wallace.

FRED W. BRADLEY, millionaire mining man of San Francisco and president of the Bunker Hill and Sullivan Mines in Idaho, will do most of his traveling to the mine in Meadow Creek basin by airplane. A landing field is being laid out in the bottom of the canyon in which the mine is located. A flat stretch in the bottom of the canyon, a half-mile long and 800 feet wide, has been cleared of trees. The planes which will be used during the winter months will be ski-equipped for landing in the snow.

CALDWELL now owns an airport of 160 acres. It is exceptionally well situated and free from all obstructions.

IVAN L. NELSON, Boise airport superintendent, began a course of practical instruction on engines at a recent meeting of the Boise Flying Club.

THE United States Government signed a contract with the Idaho Power Company for the installation of six beacon lights on the established route of airplane travel between Boise and Salt Lake City. All six of these lights will be located in southern Idaho at the following points: Bliss, Tuttle, one half mile north of Wendell, two miles east of Jerome, and five miles east of Hazelton.

DEDICATION of the Lewiston-Clarkston Airport was held October 20-21 with an air derby. The Spokane Airway Company coöperated with the Clarkston Chamber of Commerce and the Lewiston Commercial Club in arranging the program.

Lieut. Jack Allenburg, of the national guard air unit at Spokane, won the prize for stunting. Nick Mamer won the dead stick landing contest; Lieut. C. E. Forbes, the bombing contest; and Ralph Daniels, flying the Curtiss-Robin of the Spokane Airway, Inc., the ten-mile race for commercial planes. A special race between Nick Mamer's Stearman and Pilot Genero's Eaglerock was won by the Eaglerock.

NEW MEXICO AIR NEWS

Albuquerque Airport

ALBUQUERQUE Airport is a square field of about 160 acres. It is situated on a mesa five miles southeast of Albuquerque, at an altitude of 5,400 feet above sea level. There are four runways 500 feet in width, of which two are 3,300 feet long and two, 2,600 feet long. A hangar measuring 60 feet by 80 feet has been erected. Gasoline, oil and servicing are available. The field is operated by Albuquerque Airport, Inc.

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Built by E. M. Laird Airplane Co., Chicago

A Custom Built Job
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HOW CAN I LEARN TO FLY?

Everything can be done in more than one way—but there is only ONE RIGHT WAY. The RIGHT WAY to learn to fly is to know first of all the Theory of Flight, Aerodynamics, Aerial Navigation and Meteorology, and many other fundamentals of Aeronautics. When you have mastered these essentials, actual flying can be learned in much less time than is otherwise necessary. If you want to learn the RIGHT WAY

Get Started — Act Today!

$1 Starts You Now!

For a limited time we will send you the first lesson of our Complete Course for only $1. This lesson will introduce you to one of the fundamental steps in the science of Aeronautics. Get yours now!

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AVIATION NEEDS GREATER MAN POWER NOW!

Universal Institute of Aeronautics, Inc.,
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Please send me the first lesson of your Complete Course for which I enclose $1.

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The First Five Cylinder Radial Was Built By

KINNER



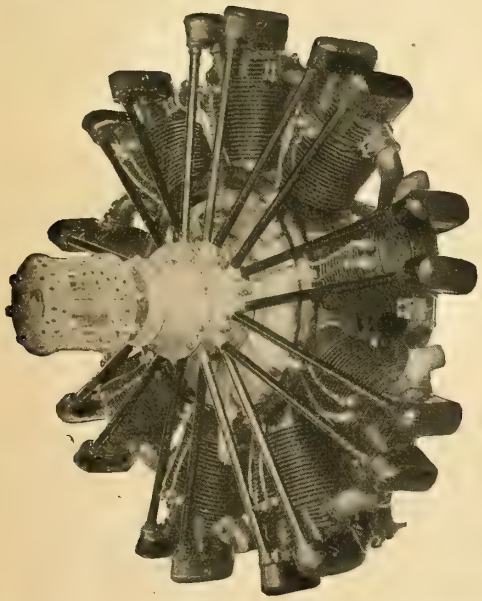
THE KINNER AIRPLANE & MOTOR CORPORATION built the original popular sized radial engine. It has been the first to discover and correct minor troubles that affect new light air-cooled power plants. Kinner continues to stand two years ahead of the field.

U. S. Dept. of Commerce Approved Type Engine Cert. No. 3.

KINNER AIRPLANE & MOTOR CORP.

San Fernando Rd. at Grand View Ave.
Glendale, Calif.

MENASCO



This powerful superposed engine possesses engineering perfection of the finest degree, insuring dependability and long life.

$3250 F.O.B. Los Angeles
Specifications on request

MENASCO MOTORS COMPANY
6718 McKinley Avenue **Los Angeles**

MILLER AIRPLANE PRODUCTS

THERE is just one way that any aeronautical project can be made to pay, and that is keep a-hustling!

At the same time, however, it is essential that the equipment be kept up to the highest point of efficiency, always ready to go and dependable when needed.

The OX-5 motor can be made as reliable as anything heretofore on the market in the way of motors.

A Millerized OX-5 represents the last word in reliability, efficiency and economy. Thousands of OX owners are now reaping the harvest from this knowledge.

If you are not fully acquainted with the many improvements possible through the use of our products on the OX, then write or wire any of our factory representatives, or to us direct for full information on Miller airplane products.

DO IT NOW!!

— also —

The book "Rev's for OX's", by Leslie C. Miller, covers maintenance and re-building of OX motors conclusively. Price $1.00.

Factory Representatives:

Nicholas-Beazley Airplane Co., Marshall, Mo.

Robertson Aircraft Corp., Anglum, Mo.

Johnson Airplane & Supply Co., Dayton, Ohio

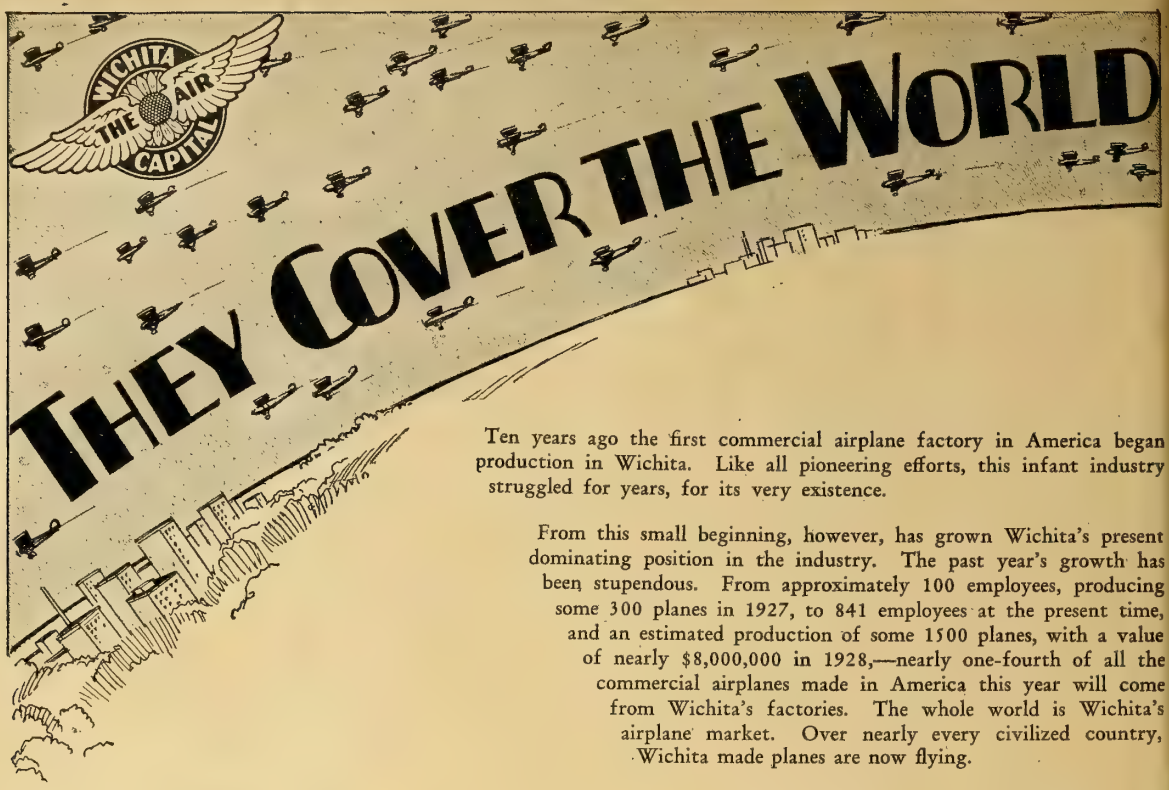
Floyd J. Logan Airplane Co.,
716 West Superior, Cleveland, Ohio

MILLER AIRPLANE PRODUCTS

***Write P. O. Box 643*, LOS ANGELES, CALIF.**

***Factory*, 3827 WEST JEFFERSON**

Say you saw it in AERO DIGEST



THEY COVER THE WORLD

Ten years ago the first commercial airplane factory in America began production in Wichita. Like all pioneering efforts, this infant industry struggled for years, for its very existence.

From this small beginning, however, has grown Wichita's present dominating position in the industry. The past year's growth has been stupendous. From approximately 100 employees, producing some 300 planes in 1927, to 841 employees at the present time, and an estimated production of some 1500 planes, with a value of nearly $8,000,000 in 1928,—nearly one-fourth of all the commercial airplanes made in America this year will come from Wichita's factories. The whole world is Wichita's airplane market. Over nearly every civilized country, Wichita made planes are now flying.

To men who have a vision of the marvelous future of this business, Wichita has much to offer. Our many factories require vast amounts of material, steel tubing, dope, airplane linen, accessories and parts of all kinds—and of course, most important of all—MOTORS.

We invite inquiry from responsible men, planning to enter any phase of the aircraft industry. Full details will be sent upon request.



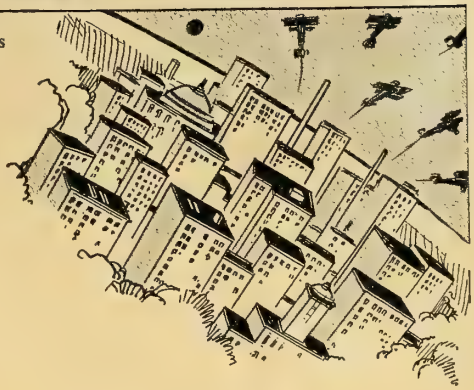
Chamber of WICHITA



Say you saw it in AERO DIGEST



THE AIR CAPITAL

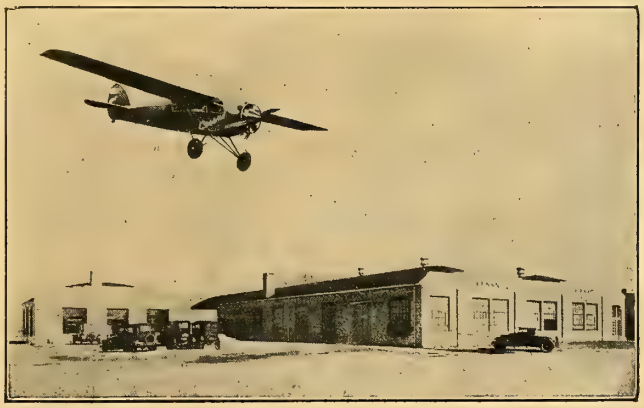


Wichita's climate is ideal, with no fogs and real flying weather 365 days of the year. The vast Kansas plains are one unending landing field for a hundred miles or more in every direction.

All Wichita is air-minded. This is evidenced by the recent addition to the curriculum of Wichita University, of a Chair of Aeronautics, offering one of the most complete courses of study to be found in any of America's Higher Schools of learning. Wichita also has seven other schools of aviation, one National Air-Mail Line, and one Passenger and Express Air-Transport Line. Other products affiliated with the industry, manufactured and marketed nationally from Wichita are:

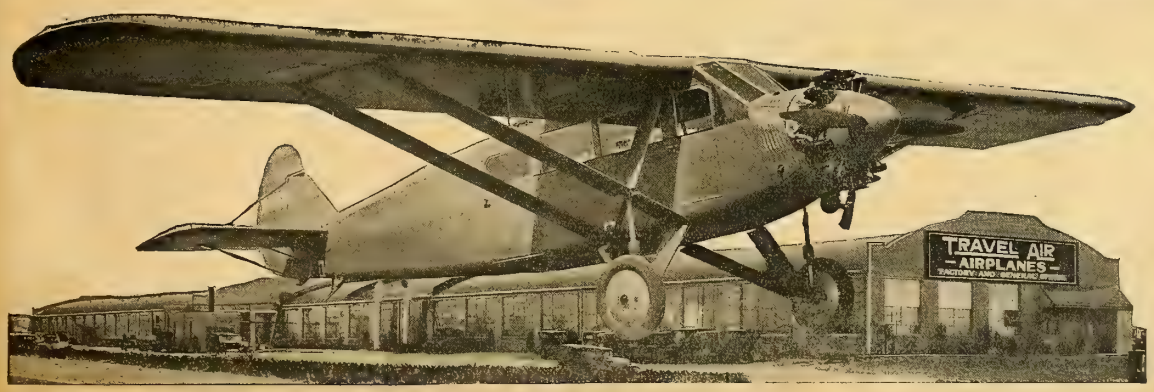
Flying Suits, Shock Absorbers, Radiators, Propellors, Motors, Airplane Batteries, Brass and Aluminum Castings, Propellors, Spark Plugs, Puttees, Leggings and Boots, Airplane Sirens, Hangars, Gas Tanks, Welding Equipment, Airplane Gasoline, as well as one of the largest jobbers of Aircraft Steel in the country.

Wichita's Airplane Manufacturers, all in active production at the present time, include:
TRAVEL AIR MANUFACTURING CO.
SWALLOW AIRPLANE CO.
STEARMAN AIRPLANE CO.
CESSNA AIRCRAFT CO.
SWIFT AIRPLANE CO.



Commerce

KANSAS



NEWS OF THE AIR SERVICES

AIR CORPS EXAMS

TO meet the shortage of approximately 300 commissioned officers in the air corps of the Regular Army, examinations of applicants for appointment as second lieutenants in that corps, in accordance with the provisions of Army Regulations 605-5, will be held from December 17 to 22, 1928, and from March 18 to 23, 1929, inclusive. Due to the short time intervening between now and the December examination, this examination will be held only within the continental limits of the United States.

Boards of officers to conduct the December examination will be convened at the following-named places: Mitchel Field, Long Island, N. Y.; Bolling Field, Washington, D. C.; Langley Field, Hampton, Va.; Maxwell Field, Montgomery, Ala.; Wright Field, Fairfield, Ohio; Chanute Field, Rantoul, Ill.; Selfridge Field, Mt. Clemens, Mich.; Marshall Field, Fort Riley, Kans.; Kelly Field, Tex.; Fort Crockett, Galveston, Tex.; Crissy Field, Presidio of San Francisco, Calif.; Rockwell Field, Coronado, Calif., and Vancouver Barracks, Wash.

In view of the early date of the December examination, applications for that examination should be submitted directly to the adjutant general, as should also requests for information pertaining to that examination. Applications for the March, 1929, examination will be submitted to the corps area commanders.

NEW ALTITUDE RECORD

CAPT. ST. CLAIR STREETT, pilot, and Capt. Albert W. Stevens, observer and photographer, created a new altitude record on their flight to a height of 37,854 feet (which was recorded in the November issue of AERO DIGEST), in that this is the highest mark ever reached by an airplane carrying more than one occupant. As there are no categories for record flights in planes carrying more than one occupant, this constitutes an unofficial record only.

The purpose of the flight, however, was not to create a new altitude record but to test camera equipment in the rarefied atmosphere as well as to experiment with a new method of obtaining altitude measurements by means of photographs. Relieved of the weight of Captain Stevens and the photographic equipment carried along, the plane would have been some 225 pounds lighter.

The airplane piloted by Captain Streett was the XCO-5, equipped with the latest type supercharger.

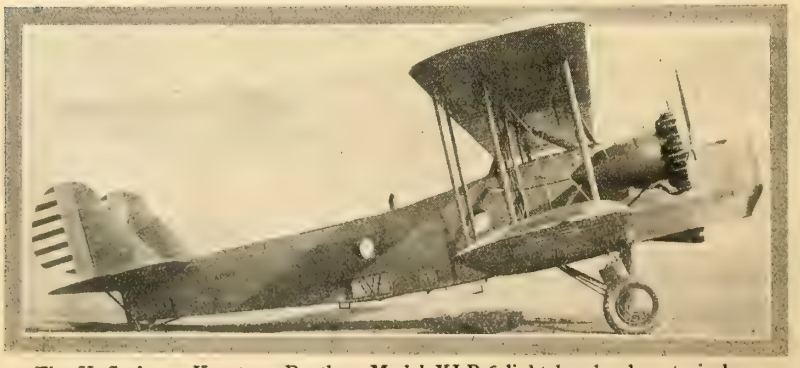
OUTLINE OF AIR CORPS TRAINING

A SUMMARY of the training requirements of Air Corps pilots and units, as issued by the War Department, follows:

The instruction to be required is divided into two parts, air instruction and ground instruction. Air training in turn is divided into two parts. The first being that which will be followed by all classes of aviation, pursuit, bombardment, attack and observation and the second being the specialties in which each class will be required to become proficient. In the first division of air instruction, officers and units of all classes of aviation will be required to make sufficient individual engineering flights to obtain consumption data on gas and oil at cruising speeds at 1,000 and 10,000 feet, altitude flights progressively to ceiling of airplane with reduced and full military loads, flights to obtain consumption data on gas and oil at full speed at 10,000 feet and at service ceiling; flights using radio, telegraph and telephone, between airplane and ground and between airplanes in flight; navigation flights over triangular courses as practicable solutions of radius of action problems progressive from 100 miles to service cruising range of airplanes, the number of individual flights to be determined locally; individual combat in which observers will man flexible guns during these flights; formation flying commencing with units of three airplanes, instruction to be progressive to squadron and group formations and will include rendezvous over objectives, problems in timing flights to distant points and flights to service ceiling with full military load; night flying commencing with individual flights in vicinity of aerodrome and to progress to include formation flying and cross-country flying by individual and formations.

In the training in the specialties of the different classes of aviation, pilots of pursuit aviation will be required to be able to perform barrel rolls (slow and fast), roll over top of loop, loop, half-roll, and flying on back; to indulge in combat exercises which will include flight vs. flight, squadron vs. squadron, flight squadron and group vs. bombardment and attack formations. Pilots of observation aviation will be required to become proficient in visual communication, using signal pyrotechnics, panels, drop and pick-up messages; in photography, requiring the making of pinpoint oblique, strip and mosaic pictures; in artillery adjustments on the smoke puff range and in liaison exercises with infantry, cavalry, field artillery, and coast artillery troops involving the use of signal devices and radio. Attack aviation will be required to undergo progressive instruction which will include attacks against targets with smoke, machine guns and rifle bombs by flight squadron and group.

Ground instruction will be conducted in troop schools which will be established by each group or squadron. The scope of this instruction will include aerial gunnery, aircraft armament, radio, aerial navigation, oxygen equipment, engineering, administration and mess management, photography, military hygiene, military law, infantry, combat orders, chemical warfare, air tactics, field artillery, coast artillery, cavalry and familiarization with the salient features of characteristic types of naval craft.



The U. S. Army Keystone Panther, Model XLB-6 light bombardment airplane.

MACKAY 1927 TROPHY AWARDED to MAITLAND AND HEGENBERGER

THE Mackay Trophy for 1927 has been awarded to Lieutenants Lester J. Maitland and Albert F. Hegenberger of the Army Air Corps for making the first non-stop flight from California to Honolulu in June, 1927.

The trophy consists of a huge silver cup donated by Clarence H. Mackay for officers of the Army Air Corps who make the most meritorious flight of the year, but it does not have to be presented annually if there has been no suitable occasion.

The first award of the Mackay Trophy was made in 1912 to Lieutenant (now Major) H. H. Arnold in recognition of a meritorious reconnaisance flight.

Among others to get the trophy was Captain Edward V. Rickenbacker, who received it in 1918 in recognition of his being officially credited with downing twenty-six enemy airplanes during the war.

QUALITY *Plus* PERFORMANCE



The CORSAIR

THE newest of the famous Vought line of fine airplanes is a five-purpose plane powered with Pratt & Whitney "Wasp" 425 H.P. engine, attaining the highest peak in military performance, reliability and efficiency, and maintaining the Vought standard of quality.

The *Corsair* is quickly convertible to either a land-plane, seaplane, or high-performance amphibian, and as a bombing, observation and attack plane, is capable of a diving speed of 300 miles per hour. This high military performance makes the *Corsair* unexcelled as a private or commercial plane, where such remarkable characteristics are always desirable, and very often essential.

CHANCE VOUGHT CORPORATION

Long Island City, New York

VOUGHT PLANE FLYING HOURS

For the fiscal year 1928 in U. S. Navy—29,371 hours, or approximately 3,522,000 miles—twice that done by planes of any other manufacturer.

Aeroplanes VOUGHT

See the CORSAIR International Aeronautical Exposition, Chicago—December 1st-9th

THE "CORSAIR" HOLDS FOUR WORLD RECORDS

Class C—Seaplane with 1102 lbs. ballast.
1. For Altitude.
2. Speed for 100 kilometers.
3. Speed for 500 kilometers.

Class C—Seaplane:
1. Speed for 1000 kilometers.

PARKS — *THE LARGEST CIVILIAN AIR SCHOOL*



IMPORTANT ABOUT YOUR TRAINING

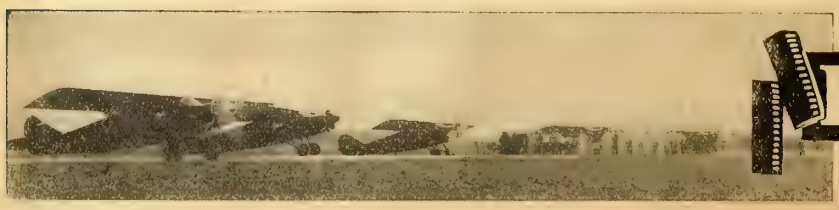
IT'S time for a little plain talk on this question of aviation-training. A hundred or more schools are clamoring for students, promising anything from a $20-a-week job to the presidency of "Super-Interplanetary Aero-Navigation, Ltd.," in six months.

What are the facts?

You don't need to be told what aviation will become within the next ten years. You know—everybody knows. Men who have flown for years know; they see the rewards of patient effort now in their grasp. Careful, conservative bankers and capitalists know. They are investing hundreds of millions in aviation, seeing large and sure profits not far ahead. *You* know, or you would not be considering aviation as a career. So much for that!

What you must have is *training*. Flying is no longer a matter of personal bravery. It's a profession—an art, in which education, training, and experience play as great a part as they do in engineering, or law, or major-league baseball.

The better school you choose, the better your chance of success, in this as in any field. Graduates of "Freshwater



PARKS

All photos taken at Parks Air College

Say you saw it in AERO DIGEST

PARKS — *THE LARGEST CIVILIAN AIR SCHOOL*

Parks-trained flyers carry a reputation

Parks graduates are known as "good men to get" throughout the aircraft industry. Parks' thoroughness is recognized everywhere. One large aircraft factory has asked us to supply them 200 pilots by Spring. Would you like one of these jobs?

Wherever you begin your work after graduation, the first question your employer will ask is: "Where were you trained?"

Will you be able to say Parks Air College? Are you going to get your training at the largest and most elaborately equipped Air School in the United States? Remember that to graduate from Parks gives you a definite recommendation.

So come to Parks at St. Louis! Learn to fly on new ships, licensed by the Department of Commerce. Fly behind OX5 and Whirlwind motors. Take your instruction under nationally-known transport pilots.



A solo student in flight

Students are enrolled from every state in the Union and from several foreign countries. Parks is putting many more men into aviation than any other school in the world.

If you could stand on Parks Airport, only 15 minutes from downtown St. Louis, hear giant motors roar into action and see the training planes go sweeping up into the sky—you would be thrilled as we are thrilled with this new, vital industry of aviation.

Delay Won't Help Your Chances—Start Now!

Start now—get this training that will put you far out in the lead—that will start you on the road to success and fortune.

Today you can receive our Regular Flying Course and Regular Pilots Ground Course at a saving of over $100.

These courses not only teach you to fly, but include Aerial Navigation and Meteorology, motor work on such famous engines as Liberty, OX5, Caminez, Whirlwind and others, Airplane Design and Construction, Shop Production Methods, Air Law, Airport Management and a host of other subjects.

Students are daily choosing Parks after personally inspecting many other schools. One says: "I selected Parks over eight other leading schools. You are decidedly in a class by yourselves."

FACTS FOR AVIATION SUCCESS

"College" sometimes achieve fame — but it's a hard battle. The man from Cornell, or Yale, or Columbia, has long odds in his favor from the start. And for very good reasons.



Coming in for a perfect landing

What School Offers Most?

Your problem, then, is to choose the school that gives you the best start—the school that equips you fully for what lies ahead of you in aviation.

Only a big school can do that. No small institution can afford the lavish equipment—the famous pilots—the skilled instructors. And the big school, properly managed, can offer complete training at no greater cost—sometimes at less—than a small place must charge. It actually costs you no more to learn aviation at Parks Air College than at schools which offer you nothing like Parks' opportunities. Parks has today over 400 students in training. No other civilian school in the country has half that number. Parks has fourteen licensed transport pilots as instructors — 26 new production ships—over $175,000 worth of plant and equipment. Parks is more than an aviation school—it is a University of the Air.

Whatever you do read "Skyward Ho!"

Ask at once for your free copy of the new 32-page edition of "Skyward Ho!"; profusely illustrated with over 100 photographs. It describes and pictures Parks Airport, the College, the shops, the course, the planes, the instructors, and students. It's fascinating—and full of real information on flying as a career.



Today, You Can Save $100 on the cost of training at Parks. Special rates are in force. To get them, you must act at once. Get your name and address to us on the coupon below. Mail it today without fail!

AIR COLLEGE, INC.

202-K MISSOURI THEATRE BLDG.
ST. LOUIS, MO.

PARKS AIR COLLEGE, INC.,
202-K Mo. Theatre Bldg., St. Louis, Mo.

Send me "Skyward Ho!" at once, with facts on the greatest aviation training ever offered and details of the limited offer that saves me over $100.

Name .....

Address .....

THE AERONAUTICAL INDUSTRY

GREAT PROGRESS MADE IN U. S. AVIATION

A PHENOMENAL record of progress in all branches of American aviation is revealed in the annual report of Major Clarence M. Young, Director of the Aeronautics Branch of the Department of Commerce.

During 1927 American factories produced nearly 2,400 aircraft having a total value of $14,250,000 as compared with less than 1,200 valued at $8,870,000 during the preceding year. Exports of aircraft and parts during 1927 amounted to nearly $2,000,000, an increase of approximately 85 per cent over 1926. During the first half of the current year our total sales in foreign markets of aircraft products were 38 per cent greater than the entire shipments of last year.

Established airway routes now cover 11,191 miles on which 27,817 miles are flown daily. Of these, 10,386 miles are under mail contract and 200 mail planes fly 23,224 miles daily over these routes. There are now 5,880 miles lighted, 1,800 miles under contract for night flying, and 5,308 additional miles considered for lighting during the fiscal year 1929. The cities actually connected by the routes at the close of the fiscal year numbered 88, the trading areas served containing 80 million people. By the close of the current fiscal year it is believed that almost all of the larger cities and many of the middle-sized communities will be connected by air routes and that small feeder lines will serve many outlying cities. Operations over the established airways, although the backbone of our commercial aviation, form only one-tenth of all civil flying.

Approximately 600 airplanes are being built in American factories each month which have to be inspected as to their airworthiness.

Applications for pilot's and mechanic's licenses showed striking increase during the past fiscal year. By June 30 last applications were on file for over 5,500 and 5,000 mechanics which was about three times the number on file on the corresponding date the previous year. On June 30 over 4,700 applications had been received for licensing airplanes as compared with 1,100 at the end of the 1927 fiscal period. Up to June 30 last, licenses had been issued for approximately 3,000 pilots, 3,000 mechanics and 2,000 airplanes. In addition, 4,000 applications for students' permits have been filed.

Among the interesting developments of the past fiscal year cited by Major Young in his report was the creation of an accident board within his organization to investigate all civil aircraft accidents with the view to determining and eliminating their causes. This board is composed of two experienced pilots, a flight surgeon, a lawyer versed in air law and an aeronautical engineer. A careful analysis of accidents is made and a percentage valuation assigned to contributory causes. This method, it is declared, will provide statistics to show the exact causes of accidents and point the way to their elimination. It will also provide a valuable index to those portions of the air commerce regulations regarding both personnel and materiel that may be unnecessarily severe, or where higher safety standards are requisite and more exacting and specific regulations must be imposed.

EXPORTS FOR 1928 EXCEED 1927 TOTAL

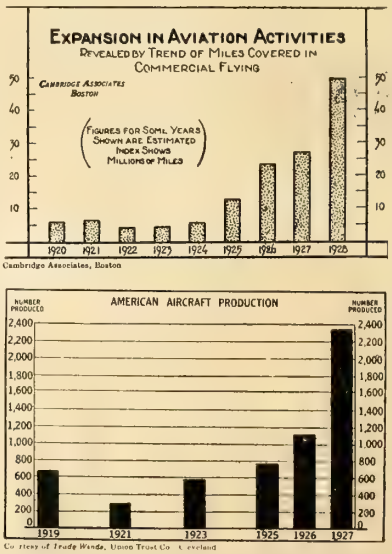
THE value of foreign shipments of American aircraft, engines and parts for the first eight months was $2,606,603, or more than $700,000 higher than that for 1927, according to figures of the Transportation Division, Department of Commerce.

American aeronautic exports for other periods were 158 per cent greater than for the same period in 1927, when they totaled $1,010,055.

Airplanes, seaplanes and amphibians made up the bulk of the exports, 118 of them valued at $1,308,099 having been exported compared with sixty-three valued at $848,568 for all of 1927.

Parts of aircraft and accessories were the second aeronautic export item of importance, $882,120 being shipped abroad, and to bordering countries, during the January to August period, as compared with $570,117 during the whole of 1927.

Engine exports totaled 117 for the eight months. These aircraft engines reached a valuation of $416,384, compared with eighty-four at $484,875 for the preceding calendar year. The unit valuation of the engine exports was $3,560, which indicates that the majority at least were not of the war production type.



Eight years' advance in aviation activities and production in the United States.

Canada remained the principal market for planes, engines and parts. Peru, Germany and Soviet Russia in Europe, respectively, were second in importance as markets for the three classes of aeronautic products. Mexico as a market for planes was 12 times as large as in 1927.

Peru received twenty airplanes valued at $147,500 during the eight months, as compared with eight valued at $190,111 during 1927. Five planes exported to Australia had an aggregate unit valuation of slightly more than $3,000, indicating they were small ones, for private use. At present United States airplanes are not licensed for commercial use in Australia.

The United States was the leading market for German aircraft, taking 10. It was followed by Brazil with 8, Italy and Switzerland with 5 each, and Austria with 4, Colombia, Argentina, and Chile received one each of German planes at high valuation, thus indicating the competition encountered by American planes in South America. The French also have been active in Argentina and Brazil.

Brazil, Germany, and the United Kingdom are the leading secondary markets for aircraft parts from this country.

Following the leading markets for aircraft engines—Canada and Germany—the best secondary markets were the United Kingdom and China. Nine countries were added to our engine markets in the 1928 period, to which no engine shipments were made in 1927 period, and seven markets to which we shipped in 1927 failed to take any of our engines in the 1928 period.

The export figures for planes, engines and parts show that the South American sales have increased materially. Reports from that section point toward greater sales within the next year if American manufacturers develop the business properly; this, in some cases, will necessitate sending demonstration planes.

The Far East, including China and Japan, particularly the former, is receptive to airplanes from this country.

SAFETY in AIR TRAVEL

THE safety and reliability of modern commercial aviation is clearly demonstrated by the operations records of National Air Transport, Inc. Since the company began operations in May, 1926, its planes have flown more than 3,300,000 miles without injury to a passenger, or the loss of a single ounce of mail or express. This mileage was flown on regular N.A.T. routes, over half of it at night and through all kinds of weather. During September N.A.T. planes flew 175,000 miles without a forced landing resulting from mechanical difficulties.



Wilbur and Orville Wright, whose first plane flew at Kitty-Hawk in 1903.

DEPENDABILITY RIDES THE HEAVENS ON SKF BEARINGS

THE fledgling that tried its uncertain pin-feather wings at Kitty-Hawk in 1903 now soars. The wings of the ostrich have grown into the pinions of the eagle. The airplane is here to stay!

Curtis helped it cut its baby teeth. Lindbergh, Byrd, Chamberlin and a few others not only helped it out of its teens, but convinced a doubting, half-fearful world that air transportation was here—that, at last, *dependability rides the heavens.*

SKF Industries, Inc., has contributed nothing to the progress of aviation but the highest type of anti-friction bearings SKF laboratories could produce. They rode with Lindbergh to Paris—with Chamberlin to Germany—with Byrd to Ver-Sur-Mer—with Maitland and Hegenberger to Honolulu.

But in these accomplishments there is the pride that comes from making even the most inconspicuous of products so much better than any one has made it before that men whose lives *depend* upon it, *select* it.

SKF INDUSTRIES, Inc., 40 East 34th St., New York City

Visit the
SKF
EXHIBIT *at the*
INTERNATIONAL
AERONAUTICAL
EXPOSITION
Chicago
Dec. 1st to 9th
Booths B 27-28

SKF

Nothing is apt to cost so much as a bearing that cost so little

Ball Bearings — SKF Puts the Right Bearing in the Right Place — Roller Bearings

1884-S

Exhibits at the Chicago Aeronautical Show

SOME of the exhibits at the International Aeronautical Exposition at Chicago, December 1-9, are described below:

A C Spark Plug Company

The exhibit of AC aviation products consists of spark plugs, tachometers, fuel pumps, oil temperature gauges, oil pressure gauges, ammeters and instrument board panels.

E. B. Meyrowitz, Inc.

The entire line of Meyrowitz goggles will be displayed. The newest type Luxor United States Air Service Model 7, for which the Army Air Corps recently placed an order with the company for 4,000, will be featured. Meyrowitz makes between seventy and eighty distinct goggles besides fitting all types with prescription lenses.

Fokker Aircraft Corporation of America

The Fokker Corporation will exhibit three planes: a 14-passenger Fokker F-10 trimotor transport, a Super-Universal monoplane and an amphibian flying boat, one of the latest, most interesting and novel developments produced by A. H. G. Fokker.

The F-10 trimotor monoplane to be exhibited has just been completed for the Western Air Express. It is equipped with three Pratt & Whitney Wasp engines and seats 12 passengers in addition to two pilots. The equipment is most luxurious. It has a speed of 145 m.p.h. and can climb 1,400 feet from the ground in the first minute after its take-off.

The new amphibian flying boat, with all-metal hull, is a monoplane with an engine mounted on a streamline mount above the wing and driving a three-bladed propeller. The two pilots are inclosed in a comfortable cockpit with sliding windows, while the six to eight passengers have an unusual amount of space and comfort at their disposal in the cabin which is below the wing. The most novel part of the ship is a combination of movable stub wing pontoons for lateral stability on the water, with the wheel landing gear. When the wheels are down for landing on the ground the hinged bottom stub wings slope downwards and form part of the landing gear, the outer ends of the wheels being supported by shock absorber struts running to the front wing spar. In the up position, for use on the water, these stub wings are approximately horizontal and form pontoons for lateral stability on the water. In this position, by an arrangement of hinges in the shock absorber struts, the wheels are folded into a horizontal position and lie in a recess in the tip of the stub wings thus being entirely streamlined.

The engine fitted on the amphibian exhibited is a Pratt & Whitney Wasp but the ship may also be fitted with several other engines such as a Pratt & Whitney Hornet or a Wright Cyclone.

The third Fokker plane to be exhibited is a Super-Universal. It is one from the latest production series developed from the experimental ship exhibited at the Detroit Show in April.

In addition to the equipment in the show, the Fokker company will have available for demonstration at the Chicago Municipal Airport an F-10 14-passenger trimotor monoplane of the same type as the Western Air Express ship on exhibit at the Coliseum; also a Fokker Super-Universal of the latest type, and a Fokker F-VII, 8-10 passenger monoplane fitted with a single Pratt & Whitney Hornet engine.

There will also be shown an interesting display of large photographs and models of a number of famous Fokker planes including the Army non-stop transcontinental T-2, the Trimotor used by Maitland and Hegenberger on the first Hawaiian flight from San Francisco, the *Josephine Ford* of North Pole fame, Commander Byrd's transatlantic *America*, Amelia Earhart's *Friendship*, the first trimotor seaplane to cross the Atlantic, the Fokker *Southern Cross* and the Byrd Antarctic Super-Universal monoplane *The Virginia*.

American Eagle Aircraft Corporation

Four types of American Eagle airplanes will be exhibited at the exposition. Heading the lineup of new American Eagles for 1929 will be a new monoplane of conventional type for 3 passengers and express or mail, or 5 passengers. Other new ships will be a small folding wing sports biplane and a new type 2-passenger plane for use in training schools. The present popular 3-passenger biplane appears with several new ideas and refinements incorporated, especial attention being paid to appointments and finish.

The new 1929 American Eagle Model A-229 training airplane incorporates many new and novel ideas, chief among which are adjustable seats, dual instrument panels, a narrower fuselage, giving the airplane racing lines, and a rugged split axle type landing gear. Due to design and construction, this airplane offers virtually 100 per cent visibility for both student and instructor.

It is powered with the Curtiss OX-5 90 horsepower motor. It has an overall length of 24 feet; wing spread, 30 feet; take-off, 150-250 feet; landing speed, 30 m.p.h.; and high speed, 100 m.p.h.; gas capacity, 35 gallons; oil capacity, 3 gallons.

The other new ship in the American Eagle lineup for 1929 is the Model A-429, a compact folding wing biplane powered with the new approved LeBlond 60 horsepower air-cooled radial type motor.

The ship is a single control plane and carries one passenger in addition to the pilot. When the wings are folded back, the airplane, known also as the Flyabout, requires a space 20 feet x 9½ feet for storage. It has a high speed of 100 m.p.h.; landing speed, 25 m.p.h.; take-off, 50 feet; length overall, 19 feet; wing spread, 27 feet 11 inches; and gas tank capacity of 12 gallons.

The fourth ship in the 1929 American Eagle line is Model A-129, the 3-place open cockpit commercial type plane which has become so popular in the last three years. The A-129 is powered with the Curtiss OX-5 90 h.p.; Warner Scarab 110 h.p.; Curtiss Challenger 170 h.p.; Wright J6-Jr. 150 h.p.; Hispano Suiza A 150 h.p.; Hispano Suiza E 180 h.p.; Wright J6 225 h.p. motors.

Headquarters for the American Eagle Aircraft Corporation will be in the Stevens Hotel. E. E. Porterfield, Jr., president of the company; D. H. Hollowell, sales manager; Jack E. Foster, chief engineer; Dan S. Noonan, production manager; H. S. Lowe, general district sales manager; and Erle H. Smith, sales promotion manager, will represent the company at the show.

Mahoney-Ryan Aircraft Corporation

The Ryan Brougham for six, to be introduced at the Chicago Show, is the first plane to be turned out at the new factory of the Mahoney-Ryan Aircraft Corporation at Anglum, Missouri, and represents the first addition to the regular Ryan line since the New York-Paris flight by Colonel Lindbergh.

This plane, engineered around the new Wright 300 h.p. engine is similar in appearance to the regular Ryan Brougham in production with the 200 h.p. engine. Certain refinements, however, have given it a phenomenal performance for this horsepower.

Haskelite Manufacturing Corporation

The Haskelite Manufacturing Corporation will exhibit samples of Haskelite, Plymetl, Aluminum-Plymetl and Duralumin-Plymetl used in airplanes for: fuselages, leading edges, engine bearers, flooring, tail linings, center ribs, tank cover, center cover, pontoon parts, walkway ribs, wing ribs, box beams, seats,, rudder, step board, drag ribs, end and tail ribs, walkway, headpads, propeller spinner, wing covering, bulkheads or partitions, pontoon covering, aileron or elevator surfaces, instrument boards, after deck bulkheads, webs and wing spars, bracing instead of wire, gusset plates on fuselages and on landing gear struts like box struts.

Airplane parts are furnished by: Consolidated Aircraft Co., Boeing Airplane Co., Chicago Aviation Co., O. E. Szekely, Aircraft Industries, Inc., Buhl Aircraft Co., Kreider-Reisner Co., American Eagle Aircraft Co., Pheasant Aircraft Co., Advance Aircraft Co., Waterhouse Aircraft, Inc., Mohawk Aircraft Co., Yackey Aircraft Co., Cessna Aircraft Co., Travel Air Mfg. Co., International Aircraft Co., U. S. Airplane Co., Knoll Aircraft Company, and other leading aircraft manufacturers.

Fairchild Aviation Corporation

The Fairchild Corporation is offering for 1929 a complete line of two, four and seven passenger monoplanes, which will be on exhibition at the Coliseum and in the air at the Municipal Field.

The Fairchild "21" is a two-place open cockpit training plane with a top speed of 105 m.p.h., a cruising speed of 90 m.p.h., and a landing speed of 40 m.p.h. It is powered with an 80 h.p. Genet engine. Every inch of it is designed as a training plane. There is no change in balance between power

(*Continued on next page*)



Dont fail to See SPARTAN at the Chicago Show

Mr. Dealer: . . . . 1929 is destined to be Aviation's "red letter" year. . . . . Gradually but surely a substantial, permanent market for airplanes is developing. . . . . The day of barnstorming is over. . . . . Henceforth your primary market will be found among *business* men—prosperous, forward-looking corporations, administrative and sales executives, engineers, contractors.

This type of men will not consider any but the best and safest equipment. They also will insist on planes backed by adequately financed manufacturers who can be counted on to remain in business.

Contract for the right kind of a plane, at the Chicago Show, and cash in on your good judgment in 1929.

SPARTAN is a plane of the finest design, materials and construction that aeronautical science has as yet achieved. Power plant is the most dependable and efficient obtainable—the 120/135 H. P. Walter 9-cylinder, radial, air-cooled motor, holder of seven world's records in flight. Behind SPARTAN stand one of the world's largest airplane factories, and business men representing 80 million dollars in resources. With SPARTAN is offered a complete educational service. The purchaser of a SPARTAN plane can secure at the SPARTAN School of Aeronautics mere instruction in flying or a complete course in aeronautical science.

See us at the Chicago Show. . . . We have important territory still open, and will welcome the opportunity to talk with you about our franchise.

SPARTAN AIRCRAFT COMPANY

TULSA SPARTAN OKLA.

(*Chicago Show Exhibits continued*)

on and power off conditions and the plane provides an excellent range of vision from both cockpits which are close together for ease of communication between the two passengers. The landing gear has been moved considerably forward of the center of gravity. It has an 8-foot tread and a tail wheel has been substituted in place of the conventional tail skid.

The Fairchild "41" is a four-place cabin ship, beautifully finished. It is powered with the Wright Whirlwind engine and has a top speed of 130 m.p.h., a cruising speed of 108 m.p.h., and a landing speed of 49 m.p.h. The chief features of the design are the folding wings, the comfort of the cabin, the lack of noise, the effective landing gear and tail wheel, the high all-round performance, and the simplicity and ruggedness of the machine as a whole.

The Fairchild "71" is a seven-place cabin job, designed for transport work. Powered with a Pratt and Whitney Wasp engine it has a high speed of 138 m.p.h. and carries a useful load of 2,700 pounds. The outstanding features of the design are the folding wings, the spacious cabin, and the ready attachment of seaplane, ski or photographic equipment, which makes it available for diversity of services.

Paragon Engineers, Inc.

Both Paragon Monoid and Tulip propellers will be exhibited at the Chicago show.

SKF Industries

Five types of bearings manufactured by the SKF Industries, will be shown at the Exposition. One of the features of the SKF exhibit will be a mechanical and decorative background covering the entire back of exhibit booths number B-27 and B-28, on the Mezzanine Gallery.

In addition, there will be numerous types of aviation equipment and accessories on display in which SKF ball and roller bearings are used.

During the show, headquarters will be maintained at the Stevens Hotel. Those in attendance at the exhibit will be: R. H. DeMott, R. O. Mongan, R. Mabley, J. B. Castino, P. A. Carlson, H. A. Gumm, W. B. Pusey, J. T. Garvin, H. A. Westwater, A. Alvin.

Aero Supply Manufacturing Company

The Aero Supply Manufacturing Company will show its complete line of screw production for aircraft construction.

Ford Motor Company

Both a Ford Wright Whirlwind and a Pratt and Whitney Wasp engined ship will be shown.

Wright Aeronautical Corporation

The exhibit of the Wright Aeronautical Corporation will consist of a Wright Cyclone 525 h.p. engine, a Wright Whirlwind 200 h.p. engine, the complete Wright Whirlwind J-6 series consisting of three models—a 300, a 225, and a 150 h.p. respectively. They are also planning to display their sectioned Whirlwind engine, which is operated by a ½ h.p. DC motor of 110 volts.

Advance Aircraft Company

Advance Aircraft Company will show its complete line of Waco planes. Particular emphasis will be placed on the new sport plane, the type which won the New York-Los Angeles transcontinental derby.

Pyrene Manufacturing Company

Two special airplane types of pressure fire extinguishers with remote control will be among the exhibits of the Pyrene Manufacturing Company. Other items in the exhibit of the company's complete line include Phomene (Foam) Accumulators, Phomene 10 and 40-gallon capacity extinguishers on wheels, 2½ gallons soda and acid, 2½ gallons Phomene extinguisher and 5 gallons Accurate non-freezing hand extinguishers for hangar, air field and airplane manufacturing plant protection.

B. Russell Shaw and Company, Inc.

The B. Russell Shaw and Co., Inc., airport construction engineers of St. Louis, will show scale models of the St. Louis Municipal Airport and the Tulsa Municipal Airport. The Shaw company will also show new developments in boundary lights, pictures of airport buildings and other items the firm manufactures.

Curtiss Aeroplane and Motor Company

Planes of many types, motors large and small, propellers and other accessories, as well as depictions of their development, will be displayed by the Curtiss Flying Service as sales agent for the Curtiss Aeroplane and Motor Company; the Sikorsky Manufacturing Corporation; the Curtiss Reed propeller, and the Curtiss-Robertson Airplane Manufacturing Company.

There will be three planes at the Curtiss booth: the Curtiss Fledgling training plane, powered by the new 170 horsepower Curtiss "Challenger" air-cooled motor, which is the type the Curtiss Flying Service has adopted as standard for aviation schools; the Curtiss Robin, a three-place cabin monoplane also powered by the Challenger, an all-'round service ship; and the versatile Sikorsky Amphibian, with 71-foot wingspread; two 410 horsepower Wasp engines; and luxurious, 8-passenger boat-like cabin.

The Curtiss exhibit will include the 170 horsepower Challenger and the 600 horsepower Chieftan, on block display. A unique contrast will be afforded by the antiquated motorcycle and its 8-cylinder, 40 horsepower engine constructed by Glenn Curtiss with which he set a world's track record of 137 m.p.h. in 1907.

The Curtiss-Reed metal propeller, which has been in aerial service for seven years, will also be shown.

In charge of the exhibit will be C. S. (Casey) Jones, president of the Curtiss Flying Service, G. Sumner Ireland, sales manager, and N. V. Clements.

M. E. Hulse

New Dictator goggles, Carson helmets and a complete line of aviation equipment will be shown by M. E. Hulse, who will place eastern distributors' contracts during the Show.

Air Associates, Inc.

Air Associates, Inc., and Campbell & Peterson will have a joint exhibit at the Show.

The former company is showing the famous Avro Avian in which Lady Heath made her solo flights from London to Cape Town, Africa, and return, and from Cape Town, Africa, to Cairo and return, also unofficial world's records for both women and light seaplanes. This same ship was lately flown by Amelia Earhart from New York to Los Angeles and return. All these flights were made without accident and with the same Cirrus Mark II 80 h.p. engine.

Campbell & Peterson, American manufacturers of the Cirrus engine, will have on display, in conjunction with the Avro Avian, a complete line of Cirrus motors.

An Avro Avian equipped with Handley Page slotted wings and the new Cirrus Mark III 95 h.p. engine will be at Chicago Municipal Airport during the Exposition. Daily flights and demonstrations will be made with this ship.

Norma-Hoffmann Bearings Corporation

The Norma-Hoffmann Bearings Corporation, manufacturers of precision ball and roller bearings, will occupy booths A2 and A3 at the Coliseum.

The exhibit that will be presented has been specially prepared with a view to showing the wide-spread use which has been found for anti-friction bearings in the aircraft industries. Beside a display of the standard "Norma" ball bearings and "Hoffmann" roller bearings in the various types, there will be a comprehensive exhibit of various units of aircraft equipment in which anti-friction bearings are regularly used.

These will include engine superchargers, engine auxiliary drive gears, propeller gear reduction units, crank shafts, cam shafts, magnetos, generators, starters, fuel pump units, radio equipment, aerial cameras, and other applications.

The exhibit will be in charge of experienced engineers in close touch with developments in the aircraft industries, who will be glad to discuss specific bearing problems with all who may inquire.

Alexson Machine Company

The seven-cylinder type Axelson radial motors will be exhibited at the Show. Jule C. Axelson, president of the Axelson Machine Company, Fred Worthy, William Laury and Wilhelm Jardh from the Los Angeles factory will be in charge of the exhibit.

Berry Brothers, Inc.

Visitors at the Berry Brothers' booth will see the only complete story in movies of the National Air Tour which took place last July. Eight hundred films were taken by Thomas B. Colby, manager of Berry Brothers' aviation division, and Charles W. Meyers of the Advance Aircraft Company.

An added attraction to this reel of flying pictures is the inclusion of several "shots" taken by Colby during his participation in the National Air Derby and National Air Races at Los Angeles this fall.

Its presentation at Chicago marks the first public showing of this fillm. All of Berry Brothers' friends are invited to drop around, enjoy these movies and otherwise make themselves at home in Booth B-32 on the mezzanine floor of the Coliseum.

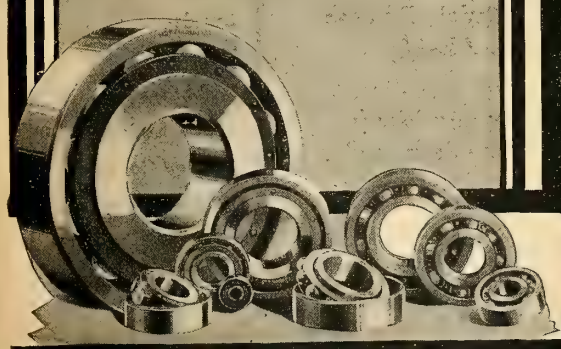
THE NORMA-HOFFMANN BEARINGS CORPORATION takes this opportunity to pay its tribute of honor to Orville and Wilbur Wright —the world's first master-flyers.

In the development of the industry which these two founded, it has been the privilege of this Corporation to share — with a product which, by its dependable qualities, has contributed to the great achievements of all those later master-flyers who have so well upheld the honor of these two pioneers of aviation.

A welcome awaits all visitors to the International Aeronautical Exposition, at Booths A-2 and A-3.



Monument to Wilbur Wright Erected at Le Mans, France.



N 77

NORMA-HOFFMANN BEARINGS CORPORATION

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS

FOREIGN DELEGATES HERE FOR INTERNATIONAL CONFERENCE

By Samuel Barker

INASMUCH as the delegates to the International Civil Aeronautics Conference were also invited to attend the Aeronautical Exposition in Chicago, they are arriving on almost every incoming steamer. Many of them will be flown to Chicago in transport planes furnished by United States operators, and thus will be in a position to study American methods first hand. The conference, to be held in Washington from December 12 to 14, inclusive, was called by President Coolidge to commemorate the first flight made by the Wright brothers and in order that there might be an interchange of ideas between aeronautics experts of all countries. Orville Wright has been named as the guest of honor at the international assemblage, and on December 17, 25 years after the first airplane flight, the delegates will visit Kitty Hawk, N. C., the scene of that momentous event.

Although the legal aspects of international air traffic are not scheduled for discussion, it is expected that the conference will develop results in this respect, as it will on some important technical points. Such subjects as operating and construction costs, navigation, meteorology, training and safety are to be covered by papers to be read before the conference. Invitations were sent to all nations, and it was asked that each delegate submit a paper, which, if not read, will be published in the minutes of the conference. As an example of the papers submitted is one by Von Otto Merkel, head of the German Luft Hansa, which is the largest single air transport operating company in the world. Mr. Merkel's paper, on the economics of air transportation in Germany, will discuss the deficiencies of the airplane, as evidenced by its extensive use in Germany, and the lines along which the airplane may demonstrate its competitive ability to the railroad and steamship.

Lady Heath, appointed as an official delegate from Great Britain, has been in the United States for several weeks, and will submit a paper on her long solo flight from London to Cape Town, South Africa. Two representatives will come from Australia, probably the farthest point from which any one will come. These delegates, Colonel Brinsmead and Sydney Hughes, will be flown from San Francisco where they will disembark December 6. Australia's position in aviation is unique, because of the distances to be traversed between large centers of population, and the two delegates from that country will have something of vital interest to tell the other delegates.

Among the United States delegates besides Orville Wright are: Colonel Lindbergh, William F. Whiting, Secretary of Commerce, Senator Hiram Bingham, president of the National Aeronautic Association, N. T. Johnson, Assistant Secretary of State, F. Trubee Davison, Edward P. Warner, Wm. P. MacCracken, Jr., assistant secretaries of War, Navy and Commerce, respectively. W. Irving Glover, Assistant Postmaster General, Dr. Joseph S. Ames, chairman of the National Advisory Committee for Aeronautics, Harry Guggenheim, president of the Guggenheim Fund for the Promotion of Aeronautics, and Lester D. Gardner, president of the Aeronautical Chamber of Commerce, complete the roster of the United States' delegates.

Since 54 nations have accepted invitations, and will therefore be represented, the conference will no doubt do a tremendous amount of good for world aeronautics. Leighton W. Rogers, executive officer for the conference, assisted by a corps of assistants experienced in aeronautics, has been making arrangements for several months for the details of the reception and entertainment of delegates. Meetings will be held in the auditorium of the United States Chamber of Commerce.

The morning sessions will be devoted to: Air Transportation, December 12; Airway Development, including meteorology and communications, December 13; and Trade in aircraft and engines, December 14. Papers on these subjects, prepared by delegates and selected by the program committee will be read at the morning sessions. They will be discussed at the afternoon sessions, along with such other topics as airports, private flying, competition, insurance, aeronautical research, aeronautical propaganda, and aerial photography.

ANNOUNCING

Rusco Safety Belts

Members of the Industry are cordially invited to see them on display at the Rusco Exhibit, Hotel Stevens, Chicago, during Aircraft Show, Dec. 1st to 9th

New and exclusive designs for both Pilot and Passenger



3" wide Pull Pin Type AE-4



3" wide Quick Release Type AE-18



5" Army and Navy Air Service Standard Type AE-19

Rusco Aero Products

- Cords
- Rings
- Braids
- Tapes
- Webbings
- Brake Linings
- Battery Covers
- Tail Skid Boots
- Baggage Compartments
- Safety Belts

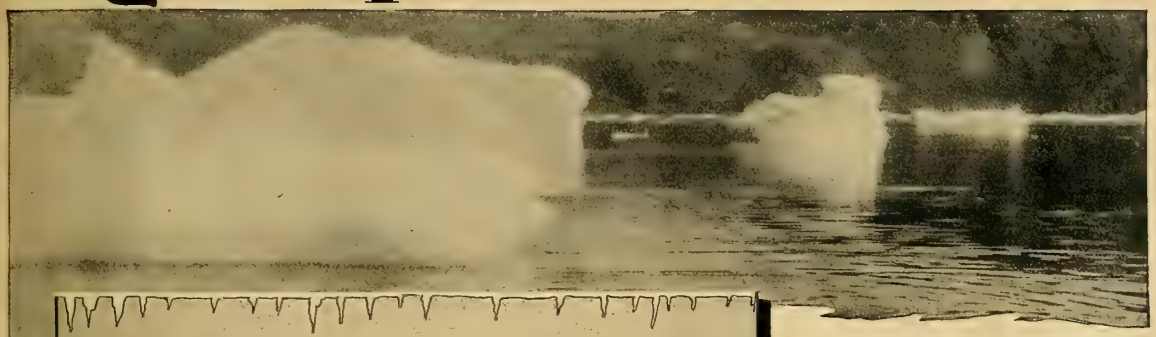
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Factories
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Say you saw it in AERO DIGEST

A good place to test oil



OTTO MILBURN, Chairman BERT HASSELL, Pilot

ROCKFORD TO STOCKHOLM
FLIGHT COMMITTEE

Rockford, Illinois

Kendall Refining Company,
Bradford, Pennsylvania,

Gentlemen:

After exhaustive tests during trial flights, most of which was at high altitudes in a round trip between Rockford and the Pacific coast, and in which Kendall " Penzbest " motor oil gave superior lubrication both at high and low temperatures, Parker D. Cramer and myself elected to use Kendall oil in the Wright Whirlwind motor of our Stinson Detroiter plane in our flight from Rockford to Greenland. The results more than justified our choice.

In the low temperatures met over Northern Canada and Davis Straits, and particularly in the extreme cold over the inland ice mass of Greenland, Kendall oil gave us perfect lubrication proving the low cold test of Kendall oil in practical operation.

Congratulating you on this most splendid product, I am youre very truly,

BRJH/KI

Bert Hassell

Bert R.J. Hassell

Greenland — where Bert Hassell and Parker Cramer proved the quality of Kendall Penzbest

"PERFECT LUBRICATION" on their notable flight from Rockford to Greenland, say Bert Hassell and Parker Cramer of Kendall Penzbest Oil. Not every pilot faces a trip to Greenland—something to be thankful for. But many of them will encounter mighty severe cold this winter right in home territory. They will need for their engines a lubricating oil that *won't* congeal the minute the motor is shut off—that *will* flow to every bearing and friction surface the instant the engine is started again.

The logical specification for severe weather conditions, is Kendall Penzbest Motor Oil. There you have an oil that will stand by you in freezing temperatures.... that circulates instantly and freely, with a minimum change in viscosity. Pistons are sealed. Moving parts protected. Repairs saved. Less strain on starter and battery. No necessity of draining and warming the oil at every stop. Better all round performance all winter.

Kendall Penzbest is derived exclusively from the Bradford (world's finest) grade of Pennsylvania Crude, of a purity so pronounced that no chemical treatment is used in the refining. Because it is *all oil*, free from impurities, Kendall Penzbest is slow to break down and gives longer service . . . the specified change period is thirty hours.

Winning pilots have expressed their faith in Kendall Penzbest in recent months by using it in such tests of speed and endurance as the National Air Tour, Transcontinental Air Derby and the Los Angeles to Cincinnati Airace.

Try Kendall Penzbest Oil this winter. Give it a real test. For a list of airports where Kendall Penzbest is now obtainable, address Aviation Division, Kendall Refining Company, Bradford, Pa.

BUY AT THIS SIGN — KENDALL PENZBEST MOTOR OILS — IT IS YOUR PROTECTION

[International Aeronautical Exposition, Coliseum, Chicago, December 1st to 9th, 1928]

KENDALL PENZBEST MOTOR OIL

REFINED FROM 100% BRADFORD GRADE OF PENNSYLVANIA CRUDE

NEW AIRLINE ROUTES and SCHEDULES

THE following new airline schedules and changes in schedules have not been published before in AERO DIGEST. A complete list of mail, passenger and express airlines was printed in the December issue. New lines opened since that date or new schedules have been added in each succeeding issue.

Air Mail

CLEVELAND, AKRON, COLUMBUS, DAYTON, CINCINNATI, OHIO; LOUISVILLE, KY. (Changed from daylight to night schedule, effective November 12, 1928.) Operated by Continental Airlines, Inc.

Time Table

Southbound (Read down)			*Northbound (Read up)*	
2:45 a.m. (E.T.)	Lv.	Cleveland	Ar.	11:30 p.m. (E.T.)
3:20 a.m.		Akron		11:05 p.m.
4:40 a.m.		Columbus		9:45 p.m.
5:25 a.m.		Dayton		9:00 p.m.
6:05 a.m.		Cincinnati		8:20 p.m.
6:15 a.m. (C.T.)	Ar.	Louisville	Lv.	6:00 p.m. (C.T.)

Passengers

CLEVELAND, OHIO; DETROIT, MICH.; CHICAGO, ILL. (Opened November 1, 1928.) Operated by Stout Air Lines.

Time Table*

Detroit—Chicago

Westbound (Read down)			*Eastbound (Read up)*	
2:00 p.m. (E.T.)	Lv.	Detroit	Ar.	5:30 p.m. (E.T.)
3:50 p.m. (C.T.)	Ar.	Chicago	Lv.	2:00 p.m. (C.T.)

Detroit—Cleveland

Eastbound (Read down)				*Westbound (Read up)*	
9:15 a.m.	4:00 p.m.	Lv.	Detroit	Ar.	10:55 a.m. 5:40 p.m.
10:55 a.m.	5:40 p.m.	Ar.	Cleveland	Lv.	9:15 a.m. 4:00 p.m.

Passenger Rates

Detroit—Chicago, one way—$30; round trip—$50.
Detroit—Cleveland, one way—$18; round trip—$35.

Reservations and Information

Detroit—Ford Airport (Phone: Clifford 0106).
Chicago—1605 Bankers Bldg. (Phone: State 0595).
Cleveland—308 Marshall Bldg. (Phone: Maine 8833).

* *Daily except Sunday.*

Passengers

ST. LOUIS, KANSAS CITY, MO. (Opened November 15.) Operated by the Robertson Aircraft Corporation, unit of the Universal Air Lines System.

Time Table*

Westbound (Read down)			*Eastbound (Read up)*	
2:15 p.m.	Lv.	St. Louis	Ar.	11:10 a.m.
5:00 p.m.	Ar.	Kansas City	Lv.	8:30 a.m.

* *Connection is made with the St. Louis-Chicago route.*

Passenger Rates

Kansas City—St. Louis: $30 one way; $55 round trip.
Kansas City—Chicago: $55 one way; $105 round trip.

Reservations and Information

St. Louis—Lambert-St. Louis Airport (Phone: Avery 2725-2726); H. J. McNally, Gen. Traf. Mgr., Planters Bldg., 4th and Pine Sts. (Phone: Main 3556).
Reservations may also be made at all leading hotels and tourist agencies.

Air Mail, Passengers

CHICAGO, CHAMPAIGN, ILL.; TERRE HAUTE, EVANSVILLE, IND.* (Passenger service opened November 10; air mail, November 19, 1928.) Operated by Interstate Air Lines, Inc.

Time Table

Southbound (Read down)			*Northbound (Read up)*	
9:00 a.m.	Lv.	Chicago	Ar.	5:00 p.m.
10:20 a.m.		Champaign		3:25 p.m.
11:05 a.m.		Terre Haute		2:50 p.m.
12:05 p.m.	Ar.	Evansville	Lv.	2:00 p.m.

Passenger Rates

	Chicago	Champaign	Terre Haute	Evansville
Chicago	———	$15.00	$23.00	$36.00
Champaign	$15.00	———	11.00	20.00
Terre Haute	23.00	11.00	———	14.00
Evansville	36.00	20.00	14.00	———

Reservations and Information

Chicago—105 West Adams St. (Phone: Franklin 4220).

* *This route is part of the proposed Chicago-Atlanta air mail service, the rest of which will be opened December 1st.*

Air Mail

C. A. M. 27—BAY CITY, SAGINAW, FLINT, LANSING, KALAMAZOO, DETROIT, ANN ARBOR, JACKSON, BATTLE CREEK, MUSKEGON, GRAND RAPIDS, MICH.; SOUTH BEND, IND.; CHICAGO, ILL. (Westbound schedule is revised.) Operated by Thompson Aeronautical Corporation.

Time Table

Westbound (Read down)				*Eastbound (Read up)*	
4:05 p.m. (E. T.)		Lv.	Bay City	Ar.	11:40 a.m. (E. T.)
4:15 p.m. (E. T.)			Saginaw		11:30 a.m. (E. T.)
5:00 p.m. (E. T.)			Lansing		10:40 a.m. (E. T.)
5:00 p.m. (C. T.)		Ar.	Kalamazoo	Lv.	8:55 a.m. (C. T.)
4:05 p.m. (E. T.)		Lv.	Detroit	Ar.	11:40 a.m. (E. T.)
4:30 p.m. (E. T.)			Ann Arbor		11:15 a.m. (E. T.)
5:10 p.m. (E. T.)			Jackson		10:45 a.m. (E. T.)
5:40 p.m. (E. T.)			Battle Creek		10:15 a.m. (E. T.)
5:00 p.m. (C. T.)		Ar.	Kalamazoo	Lv.	8:55 a.m. (C. T.)
4:05 p.m. (C. T.)		Lv.	Muskegon	Ar.	9:55 a.m. (C. T.)
4:35 p.m. (C. T.)			Grand Rapids		9:35 a.m. (C. T.)
5:00 p.m. (C. T.)		Ar.	Kalamazoo	Lv.	8:55 a.m. (C. T.)
5:05 p.m. (C. T.)		Lv.	Kalamazoo	Ar.	8:50 a.m. (C. T.)
6:25 p.m. (C. T.)			South Bend		8:10 a.m. (C. T.)
7:20 p.m. (C. T.)		Ar.	Chicago	Lv.	7:15 a.m. (C. T.)

* *Effective December 1, 1928, Pontiac and Flint, Michigan, will be added to the above schedule.*

Going to the Miami Exposition?

On January 7th & 8th, 1929, the City of Miami will hold its All American Air Meet and Exposition at Miami Airport. Prizes totalling five thousand dollars will be distributed among the winners of the fourteen civilian events.

On January 9th, immediately following the Air Meet, the formal opening of the new Pan American Airways Airport will take place.

To reach Miami by air follow the New York to Miami, Florida, air mail route.

Don't Forget!

January 7th, 8th and 9th
at Miami, Florida.

CITY OF MIAMI

Another Ireland Flying Boat to Curtiss



Curtiss Flying Service has given the Ireland Flying Boat the most severe and practical test possible. The first one delivered about a year ago has been punished in storms, rain, sleet and rough seas, making daily trips up into New England or down the coast.

Passengers have been carried comfortably and safely in this luxurious air-taxi service on all kinds of missions, in all kinds of weather. Special merchandise and newspapers have been delivered by air under rigid schedules.

Now Curtiss has just received another Ireland Flying Boat for service in Florida. The boat has been delivered and is already in operation. Seaworthiness is a major factor in flying over the semi-tropical seas between Florida, the Bahamas, Cuba and the West Indies.

The staunchness of the all metal hull has been proven in rough weather and its distinctive design makes for easy landings and the speediest of take-off.

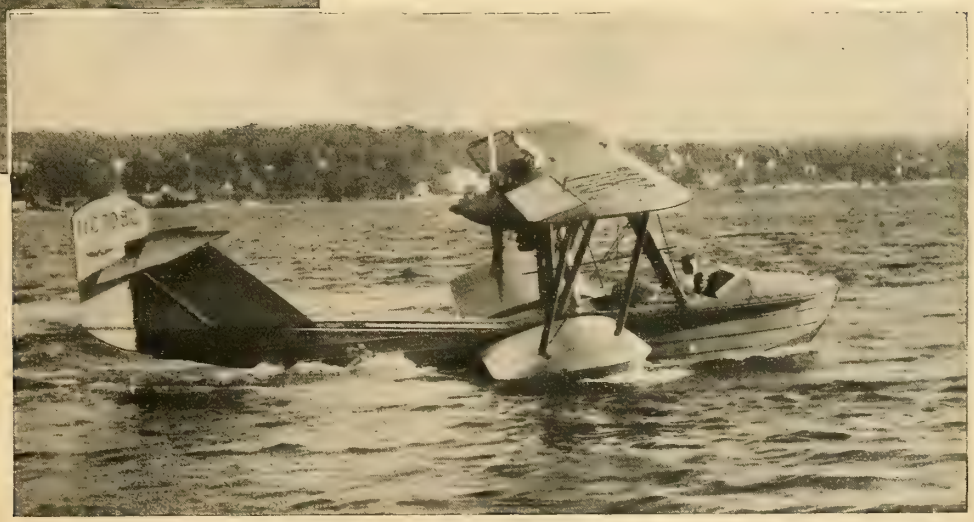
For sportsmen, no more enjoyable, safer and air and sea worthy, flying yacht is available. And for operators, the Ireland Flying Boats will carry a profitable pay load comfortably, continuously and with a wider latitude of safety than any other type that is flown over water.

Write for complete specifications and prices.

Ireland Flying Boats

Ireland Aircraft, Inc.
Garden City, N. Y.

New York Office, 501 Fifth Avenue



AIR TRANSPORT ROUTES IN THE UNITED STATES

Airway	*Miles*	*Serv.†*	*Schedule*	*Commenced*	*Operator*
San Francisco—Chicago*	1949	MPE	Daily	9/ 8/20	Boeing Air Trans.
Lincoln—Chicago* (482m.)	353	MPE	Daily	7/10/28	Boeing Air Trans.
Chicago—New York*	723	ME	Dly. & Nly.	7/ 1/19	National Air Trans.
Chicago Cleveland (313m.)	—	P	Daily	9/15/28	Universal Air Lines
Toledo—Detroit	54	ME	Nightly	8/ 1/28	National Air Trans.
Detroit—Cleveland	155	P	2t. dly. ex. Sund.	9/ 1/27	Stout Air Service
Detroit—Chicago	252	E	6 d. a wk.	2/15/26	Ford Motor Co.
Detroit—Chicago (252m.)	—	P	Dly. ex. Sun.	11/ 1/28	Stout Air Services
Salt Lake City—Pasco	540	M	Daily	4/ 6/26	Walter T. Varney
St. Louis—Chicago*	268	ME	5 d. a wk. (Nly.)	4/15/26	Robertson Air. Corp.
St. Louis—Chicago* (268m.)	—	P	5 d a wk. (Dly.)	8/20/28	Robertson Air. Corp.
Los Angeles—Salt Lake City*	633	MPE	Daily	4/17/26	Western Air Express
Dallas—Chicago*	995	ME	Daily	5/12/26	National Air Trans.
Kansas City—Chicago* (454m.)	—	ME	Daily	2/ 1/28	National Air Trans.
Kansas City—Wichita (173m.)	—	P	Daily	———	Wichita Air Serv. Prov. Co.
Tulsa—Ponca City*	72	ME	Daily	7/ 5/28	National Air Trans.
Tulsa—Ponca City (72m.)	—	P	Daily	———	Paul R. Braniff, Inc.
Pueblo—Cheyenne*	200	MPE	Daily	5/31/26	Western Air Express
Chicago—Mpls./St. Paul*	399	MPE	2 t. daily	6/ 7/26	Northwest Airways
Chicago—Mpls./St. Paul (399m.)	—	P	Daily	7/ 1/28	Northern Air Lines
Chicago—Madison (120m.)	—	P	Daily	7/19/28	Royal Airways
New York—Boston*	219	MPE	6 d. a wk.	7/ 1/26	Colonial Air Trans.
Los Angeles Seattle*	1080	MPE	6 d. a wk.	9/15/26	Pacific Air Trans.
Los Angeles—Oakland (378m.)	—	PE	Daily	6/—/28	Mutual Airc. Corp.
Los Angeles—San Fran. (378m.)	—	P	Daily	4/14/28	Maddux Air Lines
Los Angeles -San Fran.* (378m.)	—	PE	Daily	5/26/28	Western Air Express
Sacramento—San Fran. (88m.)	—	P	Daily	———	Union Air Lines
San Francisco -Portland (549m.)	—	PE	3 d. a wk.	3/ 5/28	Union Air Lines
Portland -Seattle (153m.)	—	PE	2 t. daily	3/ 5/28	Union Air Lines
Pittsburgh—Cleveland*	121	MPE	Daily	4/21/27	Clifford Ball
Cleveland—Albany	445	MP	Daily	12/17/27	Colonial Wn. Airways
Cincinnati Chicago*	267	MPE	Daily	12/17/27	Embry-Riddle Co.
Evansville—Chicago	264	M	Daily	11/19/28	Interstate Air Lines
Laredo—Dallas	423	MP	Daily	2/ 6/28	Texas Air Trans.
Galveston—Dallas	308	MP	Daily	2/ 6/28	Texas Air Trans.
Atlanta—New York	763	M	Dly. ex. Sun.	5/ 1/28	Pitcairn Aviation
Washington—New York (201m.)	—	P	Daily	6/15/28	U. S. Air Trans.
New Orleans—Atlanta	483	M	Dly. ex. Sun.	5/ 1/28	St. Tam. Gulf Coast
Seattle—Victoria	77	MP	Variable	10/15/20	Barnes & Gorst
Pilottown—New Orleans	75	M	Variable	4/ 9/23	New Orleans Air Lines
Miami—Havana	261	MP	Daily	10/28/27	Pan American Airways
Wilmington—Avalon	32	PE	2 t. daily	6/—/22	Western Air Express
Detroit—Buffalo	218	E	6 d. a wk.	3/28/27	Ford Motor Co.
San Diego—Los Angeles	115	P	Daily	11/ 1/27	Maddux Air Lines
Los Angeles—Tucson	440	PE	3 d. a wk.	11/28/27	Standard Air Lines
Chicago—Muskegon—Bay City—Pontiac	521	M	Daily	7/17/28	Thompson Aerial Corp.
Salt Lake City—Great Falls	489	MP	Daily	8/ 1/28	National Parks Airways
Louisville—Cleveland	345	MP	Daily	8/ 1/28	Continental Air Lines
New York—Montreal	334	MP	Daily	10/ 1/28	Canadian Colonial
Minneapolis—Fargo	218	P	Daily	8/ 1/28	Northern Air Lines
Minneapolis—Duluth	138	P	Daily	8/ 1/28	Northern Air Lines
Seattle—Vancouver	143	P	Daily	———	Commercial Air Trans.
Memphis—Chicago	483	P	Daily	———	Mid-South Airways
Atlanta—Chattanooga	107	P	Daily	5/ 1/28	Tenn. Air Trans.
Tulsa—Oklahoma City	98	P	Daily	———	Paul Braniff.
Tulsa—Okmulgee	37	P	Daily	———	Paul Braniff.
Portland—Yakima	108	PE	Dly. ex. Sun.	———	Rankin Flying Serv.

ROUTES SCHEDULED

	Miles	*Service*	*Operator*
Laredo- New Orleans	615	M	St. Tam. Gulf Coast Awys.
St. Louis—Omaha	401	M	Robertson Airc. Corp.
Miami—Atlanta	622	M	Pitcairn Aviation
Atlanta—Evansville with St. Louis spur	504	M	Interstate Air Lines
Key West—Cristobal, C.Z.	1640	M	Pan American Airways
Key West—San Juan, P.R.	1260	M	Pan American Airways
Columbus—Dodge C. & Las Vegas—Los Angeles (1744)	1331	P	Transcontinental Air Trans.

* *These routes carry express under contract with the American Railway Express Co.*
† *Mail, passenger, express.*

Miles of Airways Operating	15,392
Miles of Mail Airways Operating	12,848
Miles of Mail Airways Scheduled	5,042
Miles All Airways Operating or Scheduled	21,765
Miles Flown any one day, with Mail	29,106
Miles Flown, and to be Flown, daily with Mail	39,718
Miles Flown any one day, All Services	42,008
Miles Flown, and to be Flown, Daily all Services	55,580

CIVIL AERONAUTICS

THE Government Printing Office, Washington, D. C., has just issued a new publication entitled "Civil Aeronautics". This publication has been compiled by the Office of the Legislative Counsel, United States Senate, and has been printed for the use of the Committee on Interstate and Foreign Commerce, House of Representatives, of the Congress of the United States. It contains 178 pages, and will be found very valuable to any person interested in the legislative regulation of civil aeronautics, to which it is primarily devoted.

The present publication is a revision of a similar publication issued in 1923, which was entitled "Law Memoranda Upon Civil Aeronautics."

The new publication contains the text of the air commerce act of the United States of 1926, and material relating to the legislative history of that act, including committee reports and a comparison of the bills as passed by the Senate and by the House; extracts from reports and articles on the legal problems of civil aeronautics, including publications of the American Bar Association and the Conference of Commissioners on Uniform State Laws; extracts from reports on legislation on civil aeronautics of the states of the United States, including decisions of state courts; and the texts of international agreements relating to civil air navigation. The entire field of the legislative regulation of civil aeronautics is covered comprehensively up to August 1, 1928.

A copy of this publication may be purchased for 25 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

NOTICE TO PILOTS

The American Legion News Service, National Headquarters, Indianapolis, requests airplane pilots to write to it, giving instances when the marking of a town's name has aided them in flying. The more detail the better. The Legion News Service wishes to use such letters in its publicity material to newspapers to inspire more towns to enter the campaign of marking large buildings.

AIR MAIL POUNDAGE FOR JULY, AUGUST, SEPTEMBER AND OCTOBER

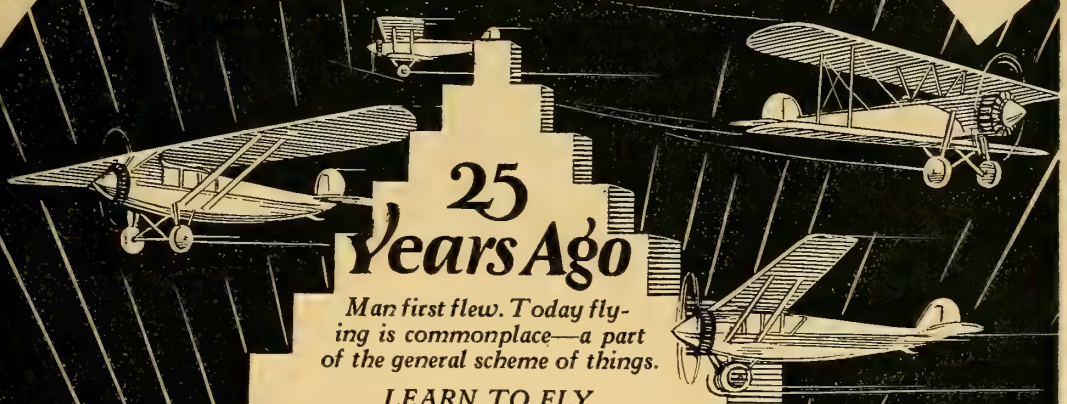
AIR mail poundage for October, 1928, totaled 467,422 as compared with 423,838 for September—an increase of more than 10 per cent. The total poundage for August was 419,047; for July, 214,654.

Poundage for the 20 air mail routes in operation during October, together with comparative figures for July, August and September follow:

Routes	Pounds			
	July	**August*	*September*	*October*
Boston-New York	3,106	7,467	6,879	8,154
Chicago-St. Louis	3,111	7,720	8,551	8,346
Chicago-Dallas	14,655	25,416	26,946	30,750
Salt Lake-Los Angeles	22,838	39,781	43,690	45,045
Salt Lake-Pasco	7,905	14,738	16,790	17,235
Seattle -Los Angeles	8,907	15,196	15,283	16,479
Chicago-Minneapolis	3,795	7,771	7,659	8,780
Cleveland-Pittsburgh	3,390	5,438	5,401	7,304
Cheyenne-Pueblo	4,285	7,629	8,554	7,383
Cleveland-Louisville (1)	0	5,052	4,276	6,456
New York-Chicago	55,752	103,204	109,772	126,040
Chicago-San Francisco	60,951	110,796	117,639	124,501
New York-Atlanta	6 546	12,753	13,941	19,125
Albany-Cleveland (2)	3,442	7,568	7,436	7,823
Dallas-Galveston	1,970	3,023	2,948	3,481
Dallas-Laredo	2,732	3,871	4 197	7,053
Atlanta-New Orleans	2,235	3,456	3 312	4,495
Chicago-Cincinnati	2,691	5,706	5,312	5,104
Great Falls-Salt Lake (3)	0	5,874	4,381	4,305
Chicago-Bay City	5,572	26,588	10,871	9,563

* *Under five cent rate.* (1) *Began operation August* 1. (2) *Buffalo to Cleveland for May.* (3) *Suspended operation during July. Resumed August* 3.

LEARN TO FLY IN AMERICA'S AIR-CAPITAL



25 Years Ago

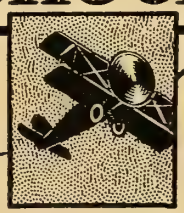
Man first flew. Today flying is commonplace—a part of the general scheme of things.

LEARN TO FLY

The place to learn to swim is in the water. The place to learn to fly is where Aviation is the "thickest." Wichita is that place beyond a shadow of doubt. Wichita, the city that is recognized as the Air Capital, building 60% of all the Nation's aircraft. What Detroit is to the automobile, Wichita is to the airplane. Also, Wichita has produced a large share of famous airmen.

The Braley School of Flying is one of the pioneer schools in Aviation and the first established in Wichita. The Braley School has been in contact and cooperating with the men who have made Wichita the "Air Capital." It is today a $250,000 corporation; the largest and best equipped flying school in the entire Southwest. It numbers among its instructors some of the country's foremost transport pilots; Its equipment, all safe, new ships; Its course of training, the best obtainable. Write us—We will be glad to tell you how we train men for successful careers in Aviation.

BRALEY SCHOOL OF FLYING



Downtown Office
201 York Rite Bldg.

WICHITA, KANSAS

Flying Field
at
Municipal Airport

NEW ENGLAND NEWS

By George W. Hamblin

AN air meet opened the Mendon Airport. This jolly old time was given by none other than Harland F. Banks, head of the National Air Pageant Association.

"Kiddy" Barrows and Stewart Chadwick of the New England Aircraft Corporation of Hartford and Worcester walked off with all the cups, having won the OX-5 races, the bomb dropping and the dead stick landing contests.

P. A. Millis owns the field, and has done a very fine job in building the place up. At present, there is a 2,300-foot runway extending north and south, and a 1,400-foot run east and west. Millis plans to extend the facilities until they include all the available land, making a run of at least 4,500 feet.

THE Boston *Evening American* hired one of Skyways' Stearmans for election night, and the ship was equipped with red lights while Hoover was leading, and green lights while Smith was ahead.

A NEW company for student instruction has been organized on the Boston Airport,—Sunset Airways. Val Chick, of Gloucester, is president, Harold Christensen is chief pilot, and George Barry is traffic manager.

OLD COLONY AIRWAYS, down at Muller Field, Revere, had an open house night, November 13, with their two hangars, shop and office open to the public. Lectures were given by Capt. LeRoy Bon Bon D'Arce, chief pilot, Mike Harlow, assistant pilot, John Polando, chief of maintenance, and the two Eds, Radasch and Fischer.

Bon Bon D'Arce, Bob Fogg and Bob Nagle gave themselves a barnstorming trip to the Stowe, Vermont, air meet. They did an overwhelming passenger business.

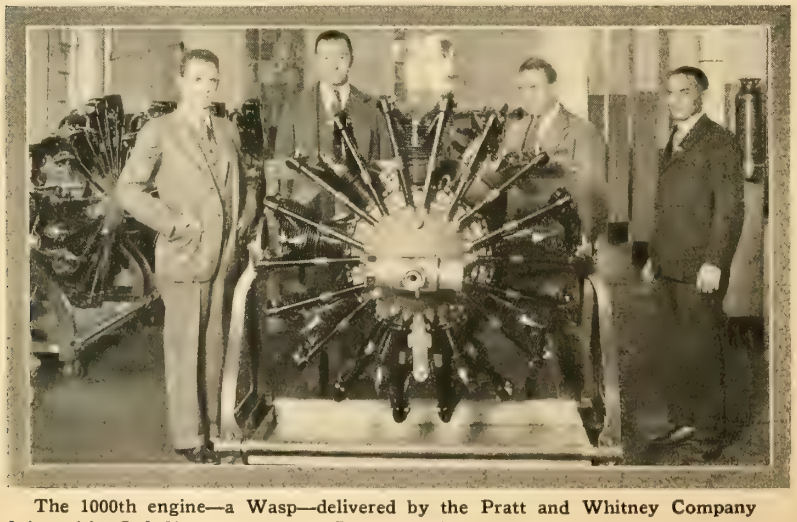
THE new runway at the Bean Town airport is nearing completion, but from where we sit, the hangar situation will remain hanging fire until next spring, and about 150,000 dollars' worth of airplanes will sit outside and be reduced to so much junk. It is a shame that permits cannot be given right now so that hangars might be built before the snow flies.

BENJAMIN FRANKLIN BILLINGS, for two and a half years operations manager of the Boston Airport Corp., has severed connections with the company, and is on his way back to Wichita, Kansas. "Bill" was liked by everybody in Boston and we miss him a lot. We hope that Bill will come back right soon, if it is only to kick us in the pants for spelling his name out in full.

Moth Aircraft Plant at Lowell, Mass.

THE Moth Aircraft Corporation's plant for the manufacture of the de Havilland "Gipsy Moth" airplane will be located at Lowell, Massachusetts. Over 100,000 square feet are included in the plant, a modern steel and brick structure located immediately adjacent to the Lowell Airport. The general factory manager is Frank M. Smith, 2nd vice president of the company; J. E. Morrow is production manager. The directorate of the corporation is as follows: Minton M. Warren, president; Earl L. House, vice president; Brodie G. Higley; J. A. Ritchie; Thomas B. Pratt; Newell P. Weed; and Kenneth R. Unger. The company will be assisted by engineers from the de Havilland Aircraft Company's factory at Stag Lane Aerodrome near London, England.

MANCHESTER may now be readily identified from the air. A directional sign 500 feet in length has been painted in chrome yellow on a black background on the roof of the Boston and Maine Railroad freight shed. An arrow indicates the direction to Manchester's municipal airport. For night flying, a rotating beacon on a 50-foot tower is operated from the roof of the R. G. Sullivan cigar factory.



The 1000th engine—a Wasp—delivered by the Pratt and Whitney Company

Left to right: G. J. Mead, vice president; F. B. Rentschler, president; D. S. Brown, factory manager; and Wm. Willgoos, superintendent of assembly.

HARTFORD AIR NOTES

By C. Stuart Henderson

THE appropriation of $396,000 for the enlargement and development of Brainard Field was overwhelmingly approved by the citizens of Hartford on election day. When the enlarged airport is completed, Hartford will boast one of the finest fields in the East, a field suitable for the landing and take-off of every type of aircraft. Starting with 96 acres in 1921, a total of 69 acres was subsequently added so that the airport included 165 acres this year.

WITH a nucleus of fifty men and boys, the Hartford Model Airplane Club got away to a flying start November 2. Thirty-five members have already signified their desire to compete for the Hiram Percy Maxim trophy, which is to be offered for the best models built. Roland B. Bourne, research engineer, was chosen president of the organization. Pilot George H. Phelps, of the Interstate Airways, was elected secretary and C. Donald McKelvie, treasurer.

THE arrival and departure of planes, aviation reports and the latest news of the day are now announced at Brainard Field by a broadcasting system recently installed outside the New England Aircraft Company's hangar. The company has "hooked up" with a local newspaper and receives daily bulletins of the latest news events.

FLOODED with orders for "Wasp" and "Hornet" engines, the Pratt & Whitney Aircraft company has increased its output to 125 engines per month. The 200 mark is expected to be reached by spring, according to Donald L. Brown, factory manager.

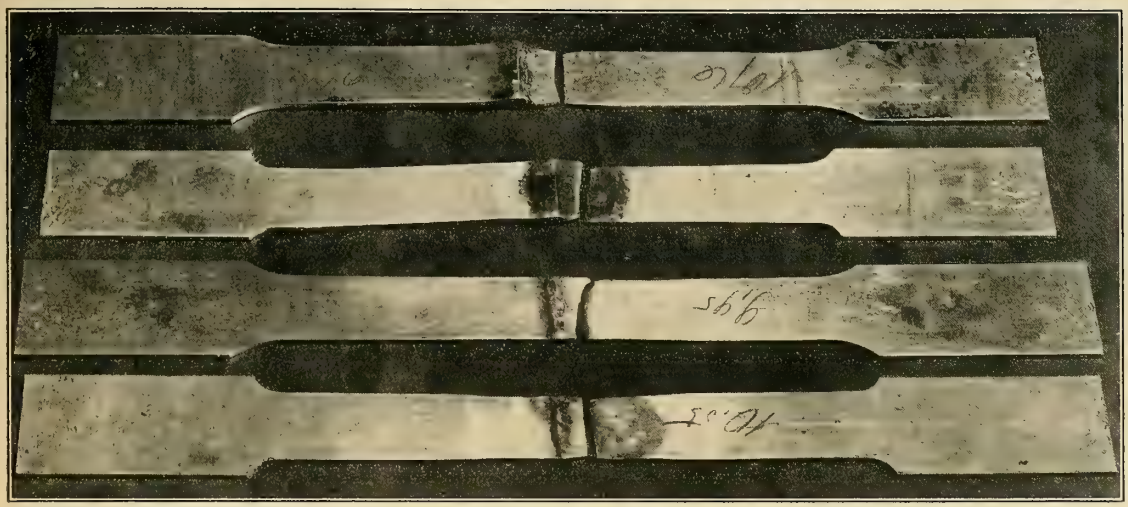
THE first intercollegiate aviation conference opened at Yale University last month, with delegates present from eleven colleges. The clubs represented at the meeting were the University of Detroit Aero Club, Harvard Flying Club, M. I. T. Flying Club, New York University Flying Club, Pennsylvania Aero Club, Cornell Flying Club, Brown Flying Club, Flying Clubs of the University of Illinois, the Aviation Club of Carnegie Institute of Technology and the Yale Aeronautical Society.

TESTS on the Maxim silencer to eliminate the roar of aircraft motors are claimed by the Fairchild Aviation Corporation to be satisfactory. Hiram Percy Maxim, the inventor, gives reason to believe that the device can be perfected to silence the average motor.

The 1000th Pratt & Whitney Engine

ALTHOUGH the first experimental Wasp engine was tested only three years ago and quantity production of such engines not begun until 1927, the Pratt and Whitney Aircraft Corporation of Hartford had delivered more than one thousand engines by November of this year. Part of this number of shipments was for the Hornet engine.

MAKE YOUR OWN TESTS OF SOLDALUME



Some of the original test pieces

Soldalume is an aluminum solder now being used successfully by European aircraft manufacturers. It has proved its value in aircraft construction and maintenance.

Soldalume has six points of superiority which are of great importance to manufacturers and operators—viz:

1. It solders aluminum or duralumin at 350°F-400°F.

2. The ultimate strength of joints as shown by official tests in the laboratories of Columbia University, New York, is 12000 lbs. per sq. in. for aluminum and 25000 lbs. per sq. in. for duralumin.

3. Soldalume joints do not corrode in air, sea water or salt laden moist air.

4. Soldalume joints are made without danger of destroying the surrounding metal by excessive heat or hammering.

5. Soldalume joints are smooth and require no filing after they are made.

6. Soldalume when used for aluminum or duralumin joints cuts down manufacturing costs.

Some territories available for exclusive agency

A limited supply of Soldalume samples and copies of the laboratory strength tests are available for aircraft manufacturers and operators.

Aluminum Solder Corp. of America

730 - FIFTH AVENUE

NEW YORK, N. Y.

WORCESTER AIR NEWS

By Charles H. Chambers

THE Worcester airport, Whittall Field, is now completely equipped for night flying and is the only New England port so appointed to aid night fliers, according to Lieut. Irwin K. McWilliams, manager of the field for the New England Aircraft Co., Inc. The field is lighted at night only on application, for the present. If a flier is headed for Worcester, a wire sent ahead will result in lighting of the field upon his approach. A nominal fee is charged for this service.

PAUL W. SAVAGE, news photographer of the *Worcester Gazette*, has recently become affiliated with the New England Aircraft Co., Inc., as aerial photographer and has completed several sizeable assignments in Massachusetts, Connecticut and New Hampshire.

THE Worcester Flying Club has added aerial photography to its other flying activities. Charles Holmes, treasurer of the club, will be in charge of this part of the club's work.

RHODE ISLAND NEWS

By Thomas F. Bresnahan

RHODE ISLAND voters at the election last month approved the appropriation of $300,000 for the purchase of land for a state-owned airport.

There is some rivalry between the cities and towns seeking the airport, but conditions appear to favor Pawtucket, where the What Cheer Airways, Inc., have an excellent field which can be expanded. Providence is offering Gaspee Point, but the greater advantages are said to lie in the Pawtucket location because of its central location between the state borders. Pawtucket's field is nearer to the Providence postoffice than the suggested Providence site.

AN aviation technical school was opened at the North Attleboro high school on November 19. The classes, which will include all branches of the industry, are sponsored by the Curtis Aviation Service located at Martin Field, that city.

BALTIMORE AIR NEWS

By Edward Johns

THE Public Improvement Commission has purchased four tracts of land, totaling 100 acres for Baltimore's airport, and the buying of several other plots is imminent. One will be placed before an arbitration committee, because the asking price is considered too great.

The original plans for a 1,000-acre waterfront airport had to be revised slightly. Less waterfront is being taken in and the field is being run farther in from the shore. Logan Field, the present flying field, will be used until the site is prepared.

THREE Curtiss Falcons belonging to the National Guard squadron performed in an air meet at Martinsburg, W. Va., on November 11. They were flown by Major Tipton, Captain Bohlman and Capt. Charles A. Masson.

Baltimore's Armistice Day celebration was not held until Monday. The members of the squadron marched with other troops in the parade, while the winged craft flew overhead.

THE Paragon Engineers, Inc., of Baltimore, recently appointed C. C. Ludlow of Los Angeles, Calif., as Pacific Coast sales agent for Monoid propellers. The Automotive Electric Company, Inc., of Mansfield, La., will distribute Paragon products in Louisiana.

IN addition to the Monoid, the Paragon Engineers of Baltimore are bringing out a full line of lumber propellers under the trade name of Tulip. The company now is producing about ten Monoid propellers weekly and from twenty to thirty Tulip propellers.

HAGERSTOWN NOTES

By John C. Middlekauff

THE Hagerstown Airport is located on the Middleburg Pike, five miles from the Hagerstown Public Square. It is a large four-way, 60-acre level field running parallel with the pike. A hangar, with wind cones, is on the north side of the field. High grade gas, oils and repairs may be had on the field. A Ford Trimotor operated from the field during the Hagerstown Fair.

Carl Strickler of Latrobe, Pa., is test pilot and instructor at the airport.

A. H. KREIDER, president of the Kreider-Reisner Aircraft Corp. of Hagerstown is one of the most noted pilots in this part of the country. Mr. Kreider has been flying for the last ten years and knows all the tricks of the game.

A new model Challenger with Comet C-4 has just been completed by the Kreider-Reisner company.

S. D. EURICH, local business man, holds a unique position in aviation circles in this vicinity. He is a licensed commercial pilot, manager of the airport and part owner of the Challenger Flying Service and Flying School.

CIRRUS ENGINE TO BE BUILT IN AMERICA

THE Cirrus Mark III engine, a British engine manufactured by the A.D.C. company, will soon be built in the United States by the American Cirrus Engine Company. The A.D.C. company has delivered specifications and detailed production drawings to the American company. Arrangements are being made by which several complete engines, a complete set of parts, and jigs and tools are to be sent to this country.

The Cirrus engine is especially adaptable for use in two and three seater light planes. The engine was used in such planes on a number of remarkable European flights. Lieut. R. R. Bentley's D.H. Moth was equipped with a Cirrus engine on his solo flight from London to Cape Town, as was Lady Heath's Avian on her similar flight. Bert Hinkler flew a Cirrus Avian on his 16-day flight from London to Australia.

KENTUCKY AIR NEWS

By John Walker Rogers

THE Louisville and Jefferson County Air Board has awarded a contract to the General Electric Company for the erection of floodlights for night flying at Bowman Field, the municipal airport in Seneca Park, Louisville.

Roger Schupp, secretary of the Board of Park Commissioners, is secretary of the Louisville and Jefferson County Air Board; Addison Lee, Jr., is chairman, and William S. Kammerer, treasurer.

WHEN the United States Navy received a request from Dr. Hugo Eckener for a gaseous fuel to take the place of "blau gas" on the return trip to Germany, the Navy department turned the problem over to one of its former officers, R. W. Bottoms, an authority on helium gas and fractioning processes, now with the Kentucky Hydrogen-Oxygen Co.

Mr. Bottom, in his experiments, found that a by-product gas from the gasoline refining plant of the Louisville Gas and Electric Company at Winchester had an ethane content of forty or fifty per cent. This gas is a by-product of natural gas from the eastern Kentucky fields, and is used to make gasoline.

The new gas approximates the "blau gas", also a by-product of natural gas, used by the Zeppelin in its voyage to the United States and is said to have a higher calorific value.

The new fuel gas which was developed by Mr. Bottom and his associate, Herman Heck, chemical engineer for the Louisville Gas and Electric Company, has a specific gravity of 1.04, approximately that of air. It adds nothing to the weight of the dirigible and when it is consumed does not lighten the load.

One million cubic feet of the ethane gas were manufactured from three million feet of the waste gas, and shipped to Lakehurst, New Jersey.

THE Southern Air College, located on the Newberg Road, is Louisville's newest flying school. I. N. Henry is chief pilot of the organization. R. S. Rinehart is the president of the college.

GEORGE Russell, well known parachute jumper from California, has joined the staff of the Louisville Aviation Company at the Louisville Airport, near St. Matthews on the Shelbyville Road.

THE present daylight air mail service between Louisville and Cleveland was changed to a night flying schedule November 12.

The schedule is published in this issue of Aero Digest under New Airline Routes and Schedules.

JACK L. ROLLINS, pilot, has succeeded Charles Lukes as district manager of the Aviation Service and Transport interests in Louisville.

An Entire Aviation Course in Two Great Books



Richard Arlen in "Wings," Courtesy Paramount Pictures.



Everybody's Aviation Guide teaches aviation from the beginning. Gives and answers 600 important questions. Contains complete information necessary for U. S. Government license. Explains every problem up to first trial flight. Indispensable to students and beginners. 247 Pages. 140 Illustrations. Price $2.00.

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WASHINGTON D. C. NEWS

By Sam Barker

CAPTAIN DINGER of Bolling Field has made several night flights recently in the Army tri-engined Fokker over the airway markers on the roof of the Department of Commerce building. Members of the National Airway Marking Committee were taken on these trips for the purpose of determining whether the experimental markers could be seen at night under varying degrees of visibility. It was decided that several of the directional markers should be enlarged and that the colors now used, yellow figures and black borders, were the best with which the committee has experimented. Woddy Hockaday of Wichita, is carrying out the details in connection with the marker experiments. Colonel H. H. Blee, Chief of the Airports Section of the Aeronautics Branch, is chairman of the committee, which is expected to report its findings shortly.

BOB EARLE, Naval Reserve aviator, who was recently giving flight instruction in the vicinity of Philadelphia, is now in Washington as a secretary to the International Civil Aeronautics Conference. He has been flying regularly in one of the Vought Corsairs at Anacostia.

A NEW hangar for International Airways is being built at Hoover Field by the Airport Equipment Division of the Maryland Metal Building Company.

International Airways, Inc.

INTERNATIONAL AIRWAYS, INC., was recently organized for the purpose of buying and operating well located airports throughout the eastern part of the United States. The company will inaugurate its activities at Hoover Field through its operating company, Potomac Flying Service, Inc., which was organized several years ago and which has been operating a successful passenger carrying service in the Nation's Capital. (The Mount Vernon Airways, Inc., has no connection with Potomac Flying Service or with the parent company, as was stated in the September Aero Digest.)

Hoover Field comprises a tract of land of 35 acres with facilities for both land and seaplanes. Improvements planned for Hoover Field include the erection of two large hangars, the construction of a gasoline station, enlargement of terminal facilities, the laying of two concrete runways, illumination by electric sign and floodlights and the beautification of the surroundings. Instruction in aeronautics will continue to be offered, as well as sightseeing hops, cross-country flights and aerial photography.

The manager at Hoover Field is John S. Wynne. Among the pilots for the company are Lieut. Douglas Powell, Lieut. Roy S. O'Neal, Lieut. J. Hall McKenny and S. E. Steinhauer.

The officers and directors of International Airways, Inc., are: Carleton E. Moran, president; Nathaniel B. Dial, vice president; Wm. A. Morgan, M.D., vice president; John G. Walling, vice president and treasurer; James G. Nagel, secretary.

Washington-New York Airline

THE Washington-New York Airline, Inc., a subsidiary of U. S. Air Transport, Inc., was started the middle of last June. Trips did not average more than two a week for the first three months simply because there were no passengers. About the middle of September, however, travelers began to ride the line, and since October 1, planes have flown their regular schedule practically every day.

Four Whirlwind-engined Ryan cabin monoplanes operate between Washington Airport, just across the Potomac River from the capital, and the new municipal airport at Newark.

The chief pilot is Lawrence Pabst, a former Marine pilot. The other pilots are George H. Branson, who manages the Newark end of the line, and Stuart Reiss, who flies from the Washington end. Branson also is a former Marine. Reiss is a Kelly Field man. The chief mechanic at Washington Airport is L. M. Peterson, who was with Commander Byrd at Spitzbergen on his North Pole flight.

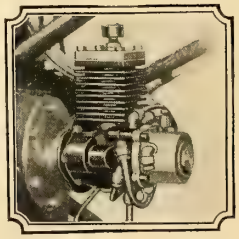
Robert E. Funkhouser of Washington, is president of U. S. Air Transport, Inc.; Eugene Smith, Washington banker, is vice president; T. Howard Duckett is secretary; and Capt. Joseph E. Boudwin, manager of Washington Airport is treasurer.

The company also operates a sightseeing service and student instruction courses at both Washington Airport and Newark, and is agent for the Ryan and Waco.

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LOUISIANA AIR NEWS

By Harold A. Dempsey

THE New Orleans Airport Commission was formed during the past month. The associations which are represented by the new Commission are: the aviation bureau of the Association of Commerce, the National Aeronautical Association, the Aero Club of Louisiana and the airport facilities committee of the Young Men's Business Club. Gilbert J. Fortier is president of the Commission.

The new Commission has joined forces with the United States Air Force Association, a non-profit organization having for its purpose the promotion of aviation in the cities of the United States.

W. R. WILLIAMSON, of the Central Airways Corporation of Chicago, has announced that a depot for his line will be established at Monroe. The corporation will establish a passenger and mail airline, passing through Monroe and linking New Orleans and Chicago.

AN airplane company with a capital of $1,000,000, known as the Gulf Air Lines, has been organized in New Orleans.

The new company has bought the St. Tammany-Gulf Coast Airways, Inc., which is now operating the mail route to Atlanta and which also has the contract to carry the mails to Mexico, which route is to be inaugurated next month. Among other plans of the new company is a line to Florida to connect with the Pan American airlines serving tropical points.

The St. Tammany company will continue to operate as a unit of the new company. The same board and officers will manage the affairs.

THE latest acquisition to Tallulah is the establishment of a flying school by the Southern Dusting Company, which has been operating from its headquarters at Tallulah for the past three years. This school is in charge of Eugene Stevens.

AIRPLANES from throughout the South, together with several army ships, will participate in the formal opening of the new air field of the Menefee Airways, Inc. The new field is located in St. Bernard parish and is two miles closer to the center of New Orleans than the old field of the company, located in Jefferson parish. The new field is known as the Meraux-Nunez tract and is situated on the St. Bernard paved highway.

AIRPORT paving will be one of the main topics of discussion when the Seventh Annual Paving conference meets in New Orleans December 3. William P. MacCracken, Jr., Assistant Secretary of Commerce in charge of aviation, and Colonel H. H. Blee, engineer for the Aeronautical Division, will be among the speakers on this subject when the association convenes in New Orleans.

TENNESSEE NEWS

By James S. Lindsey

THE bond issue of $250,000 for a municipal airport in Chattanooga, was voted on and passed in the general election. The success of the issue was largely due to the coöperation of the Chattanooga Chamber of Commerce with John Lovell, who has been nicknamed the "daddy" of aviation in Chattanooga. A committee to look after the purchase of the necessary equipment for the new airport will be appointed.

BENJAMIN KING, the former manager of Marr Field, Chattanooga, has been succeeded by Farr Nutter.

Marr Field will receive delivery of eight new Fairchild cabin monoplanes, equipped with Wasp engines. Two of these planes are especially built for student practice.

THE Brainerd Airport is progressing rapidly. Many people visit the field and fly for a cent per pound. It is located about four miles east of Chattanooga and is situated on a newly paved, wide boulevard which leads directly into the business center of the city.

ALABAMA AIR NEWS

By Robert H. Brown

ANNOUNCEMENT was made here recently at the Birmingham Chamber of Commerce of the opening of a passenger line, to be operated by the Universal Air Lines, Inc., from Dallas, Tex., to Birmingham, via Shreveport, La. The line will use Fokker planes and will make a bid for the air mail line proposed by the Government between Shreveport and Birmingham.

ROBERTS FIELD, at Birmingham, is now equipped for night flying. Obstruction lights, beacons, and other lights were installed by the City of Birmingham.

The airport at Anniston is to be lighted and the field graded, according to H. K. Glidden, assistant in charge of the work.

A beacon light at the field at Selma is being installed.

AN aviation committee has been appointed by President Harvey Kyle of the Junior Chamber of Commerce. The committee consists of: Maj. Sumpter Smith, chairman; R. M. Goodall, Jr., vice chairman; H. J. Tutwiler, Leslie Walker, Allen Rushton, John Higgins, Key Foster, Myer Davidson, John D. Chichester and Brewer Dixon.

THE Birmingham Model Aero Club, with approximately forty members, was organized last month by the Birmingham Park and Recreation Board.

THE Alabama Airways, Inc., has been incorporated at Tuscaloosa to do commercial work. The company is headed by Angus M. Taylor, president; J. E. Livingston, vice president; and Edward Lustig, secretary. Directors are: Maj. James A. Meissner, J. R. Mosby, of Helena, Ark., Hargrove Van De Graaf, Walter Brownell and T. G. Candle.

South American Trade Extension Flight

THE South American Trade Extension Flight has been organized in Birmingham for the purpose of conducting a flight through South America to spread good-will and encourage trade with the United States. The flight from North America to South America will be non-stop, after which the plane will call at all the important cities on the southern continent. A trimotor monoplane equipped with pontoons and radio will be used on the flight. An industrial motion picture will be shown in each of the principal trade centers describing the American cities participating in the flight and a group of representative industries which are making a bid for the Spanish-American trade.

The initial members of the board are Hugh Morrow, Gen. William L. Seibert, Col. Marcel Garsaud, Samuel C. King, Lester F. Alexander, Victor H. Hanson, and Henry Upson Sims. Lt. Donald C. Beatty will be chief pilot for the flight; Leslie A. Walker, navigator; R. C. Ooertel, co-pilot; W. C. Browne, assistant director; and Martel Brett, historian.

NORTH CAROLINA NEWS

Marion Airport Dedicated

FRANCIS MARION FIELD, located at Marion, was officially opened late in September with a two-day dedication program. Three army planes from Maxwell Field, Alabama, and civilian planes from several states were present. Proceeds from the meet were used to help defray the expenses of the airport.

Francis Marion Field is located two and one half miles north of Marion at the end of Lake James. The airport covers an area of 227 acres which, with the exception of 14 acres of bench land which is used for automobile parking, is sufficiently level for airplane landings. Not all of this area, however, has been developed thus far. The sand and clay soil of the field does not easily become boggy in wet weather and is fertile enough to afford a thick turf.

SOUTH CAROLINA NEWS

GREENVILLE AIRPORT was formally dedicated November 9 and 10. Prizes totaling approximately $1,000 were offered the winners of the various aerial events. The airport, which is located two miles west of Greenville, has an east-west runway 2,300 feet long and a north-south runway 3,300 feet long. Two hangars are located on the field. Errett Williams, who is distributor for Eaglerock planes in South Carolina and Georgia, is manager of the field.

VIRGINIA AIR NEWS

AN aero club was recently organized by a group of cadets at the Hargrave Military Academy at Chatham. Dues of the club are to be used for the purchase of text books on aerodynamics and aviation. The club intends to offer a ground course to its members and engage in building models. The officers are: H. W. Stephens, president; A. A. Cannaday, vice president; and H. H. Dalton, secretary.

BLAW-KNOX

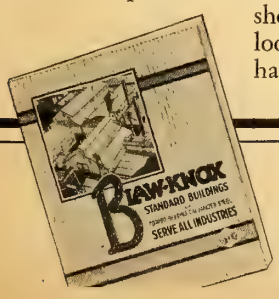
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FLORIDA AIR NEWS

By Johnson Wright

LES LEWIS, pioneer flier in South Florida and at present operator of the Hialeah Airways and Flying School, has again been appointed Inspector of Aviation for the City of Hialeah. Mr. Lewis recently returned from Youngstown, Ohio, where he operated the Youngstown Flying Service, distributor for Travel Air in that section of Ohio. Dean Jones is associated with Mr. Lewis and has charge of the ground school.

A SMALL airport will be prepared at Miami Beach. The airport will be available only for landing to take on or discharge passengers, since there will be no hangars and the planes will have to be kept on some other airport in the Miami area.

A STINSON-DETROITER monoplane will be operated on a bi-monthly service between Miami and Cleveland by the Thompson Aeronautical Corporation. Plans call for the start of this service December 1st. Ralph DeVore will be pilot of the plane on this route.

GEORGE ALDRICH of Lake Worth gave his flying equipment a complete overhaul during the period immediately following the September hurricane. The C6 powered Seagull and the Wright E Standard on pontoons are now in the air again and flying better than ever.

PITCAIRN AVIATION, INC., will extend its New York-Atlanta mail line to Jacksonville and Miami on December 1st. Southbound planes will leave Atlanta at 6:45 a.m., leave Jacksonville at 9:55 a.m., and arrive at Miami at 1:30 p.m. Northbound planes will leave Miami at 11:05 a.m., leave Jacksonville at 2:50 p.m., and arrive at Atlanta at 5:50 p.m.

THE Skyview Airlines, Inc., of Detroit has arranged for hangar space at the new Miami municipal airport for two of their trimotored Fords, which they will have available for scenic tours and charter service during the winter.

THE Queen City Airlines is also intending to operate two trimotored Fords into Miami this winter. The first of their ships is in Atlanta now being prepared for operation of a passenger service between Atlanta, Jacksonville, and Miami.

ROGERS AIR LINES, INC., has reopened its seaplane base in Miami for the eighth season. Two Seagulls, three Fairchilds, and a new flying boat with an all-metal hull, built by Rogers and which has been named the Sea Eagle, will comprise the flying equipment to be used this season. George E. McGowan will be in charge of the office, and Harry Smith will be chief pilot.

THE city commission of St. Petersburg has authorized the construction of a new combination airport for land and seaplanes on the bay front, within three minutes' walk of the center of the business district. The new airport will be named Albert Whitted Airport in honor of Lieut. Albert Whitted, naval flier who was killed in a crash in Pensacola Bay in 1923. The plans specify eight runways for landplanes, ranging in length from 1200 to 2500 feet. The landing for seaplanes will be on a basin 1000 by 1500 feet, with an opening 250 feet wide into Tampa Bay. The airport will be completely lighted with beacons, flood and boundary lights. Efforts will be made to have it completed and ready for use early next spring.

Minor improvements were authorized for the Piper-Fuller Airport, six miles west of the city. This is a good airport for landplanes and will be in excellent condition this winter, but the progressive city felt the need for a close-in modern airport for land and seaplanes.

THE University of Miami will start its aviation course December 1st. The schedule calls for the theory and ground work at the university from 1:30 to 5:30 p.m. and the flying instruction and practice during the mornings at the municipal airport, given by the Curtiss Flying Service.

THE Fort Myers Aero Club was organized October 30th. The officers are: Hugh Mauck, president; Col. J. W. Blanding, vice president; Horace A. Dunn, secretary; C. Franklin Wheeler, treasurer. The determination to secure a modern airport for Fort Myers led to the organization of the club and will be its goal.

THE Curtiss Flying Service will open its school and taxi service at the Miami Municipal Airport on December 1st. John Tuyls, former manager at Portland, Maine, has been made manager at Miami and is now in charge. J. R. Waters has been appointed local sales manager. William Hammond and Wm. Van O'Brien will be pilots and instructors at the municipal airport. Eddie Niramier will be manager of the seaplane division which has docks at the foot of N. E. Fifth Street.

A landing dock for seaplanes is being constructed on the north end of Bayfront Park in Miami for use by the company. This is a splendid location, being only six blocks from the post office and the heart of the business district of Miami.

The equipment used will consist of Travel Airs, Eaglerocks, and Curtiss-Robins and Fledglings at the municipal airport and of Ireland Amphibians at the seaplane base.

THE St. Petersburg authorities have ordered construction rushed at Albert Whitted Airport on the hangar which is to accommodate the little Goodyear dirigible, *Puritan*. The *Puritan* will leave Akron, Ohio, on December 1st in an attempt to make a non-stop flight to St. Petersburg, which if successful will be the longest flight on record by a small airship. It is the intention of the Goodyear-Zeppelin Corporation to operate the little ship from the Albert Whitted Airport throughout the entire winter, studying climatic conditions and future transportation possibilities.

THE Pan American Airways is rapidly completing preparations for the opening of its Miami to Nassau line and the extension of the Miami-Havana line down through the West Indies to San Juan, Porto Rico. The Miami-Nassau service will start the latter part of December, the 15th being the tentative date set. January 10th is the date for the extension to San Juan.

The Atlantic Coast Line Railway and the Florida East Coast Railway have announced that arrangements have been made with the Pan American to give through air and rail service from New York and other eastern points to Havana and San Juan.

One of the finest air passenger stations in the United States is rapidly nearing completion at the Miami airport. Extensive improvements are also being made at all other airports to be used on the San Juan service. Captain J. E. Whitbeck, airport engineer, has worked tirelessly during the past four months to have all of the airports in the finest shape for the opening of the line.

The overhaul and repair shops of the company, heretofore located at the Key West airport, were moved to Miami on November 1st.

All of the passenger-carrying ships will be equipped with radio, and communication will be maintained throughout the flights. Towers are being constructed at the Miami airport for the direction finder service.

Harry Rogers, president of Rogers Air Lines, Inc., is manager of the Miami-Nassau service.

MIAMI AIR DERBY

AIR DERBIES to Miami, air races and other attractions generally held in connection with air meets, will be conducted in connection with an aircraft exposition to be held January 9, 10 and 11, at which time the Miami Municipal Airport will be dedicated. This dedication will take place at the same time that Miami is celebrating its annual Palm Fête.

$25,000 is being raised by the Miami Aviation Board and the Greater Miami Airport Association for trophies, prizes, and expenses. Headquarters have been established at the offices of A. H. Hermance, aviation director for the City of Miami.

Topping the list of varied events will be the "On-to-Miami" race with New York or Detroit advanced as two of the possible starting places. (*Continued on next page*)

AIR-KING MONOFOUR

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The AIR-KING Monofour sets a new pace in take-off, climb and flying speeds without "tricky" characteristics.

Seating comfortably, 3 passengers and pilot; interior arrangement and finish like that of a fine closed car.

Inverted stick control gives pilot more leg room and permits easy operation of rudder and brake controls.

Monofour is equipped with starter and wheel brakes. Whirlwind J5 motor. Completely equipped instrument board. Dual control. Full vision forward and on sides. Sturdy landing gear. Door on both sides of fuselage. Mohair upholstering. Plenty of room for passengers and baggage. Navigation lights.

No monoplane of equal class and price can offer more in comfort, design, appearance or performance. May we send you full information?

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The Waco-10 equipped with floats operated by the Valley Air Service

(Miami Air Derby continued)

During the first two days of the meeting there will be a score of fifteen-mile races over the five-mile course. They will be for open cockpit planes of 100 horsepower; open cockpit planes of 200 horsepower; closed cockpit planes of 100 horsepower and closed cockpit planes of 200 horsepower. Added to this will be exhibition flights by some of the country's leading airmen.

PENNSYLVANIA NEWS

PHILADELPHIA AIRCRAFT SHOW

HAILED by thousands of visitors as one of the largest and most representative aviation exhibitions ever staged in the east, the first annual Philadelphia Aircraft Show was held from November 3 to 14 inclusive, in the 108th Field Artillery Armory, under the auspices of the Aero Club of Pennsylvania.

Concerns exhibiting at the show were the Aeronautics Branch, Department of Commerce; Aerial Photographic Service; American Aviator; Aero Service Corp; Aircraft & Airways of America, Inc.; Air Touring Bureau; American Airports Corp.; Maryland Metal Building Co.; Atlas Storage Warehouse Co.; Aviation Committee, Philadelphia Chamber of Commerce; Bellanca Aircraft Corp.; Berliner Aircraft Co., Inc.; Cler-Site Co.; John W. Craig; Crescent Air Service, Inc.; DeWalt Products Co.; Fischer & Jacobs, Inc.; Gardner Aviation Co.; Gaul, Derr & Shearer; Guaranteed Aircraft Hangar Co.; Harwen Products Co.; Interstate Flying Corp.; Kendall Refining Co.; Ray Krimm; Lancaster Airways, Inc.; Ludington Philadelphia Flying Service; Military Sales Corp.; Parker & Co.; Philadelphia Air Transport Co.; Pitcairn Aircraft, Inc.; Pitcairn Aviation, Inc.; Pratt & Whitney Aircraft Co.; Rand McNally and Co., Reading Airplane Co., Scott Aeronautic Co., Ltd.; Simplex Piston Ring Co.; Snap-on Wrench Co.; Stout Metal Airplane Division, Ford Motor Co.; Summerill Tubing Co.; Tidewater Oil Sales Corp.; United States Aircraft Corp.; Vacuum Oil Co.; Westinghouse Electric & Manufacturing Co.; Wolson Goggles, Inc.; 28th Division Air Service, Pennsylvania National Guard; Naval Aircraft Factory, Philadelphia.

M. G. MASON of the American Eagle Airport at Sharon has purchased a Stinson-Detroiter biplane from the Embry-Riddle Company, Cincinnati. Mason will use the ship in regular passenger service, in cross-country taxi work off of his airport and at his new winter location in Georgia.

THE Shenango Valley Air Meet was held recently at the American Eagle Airport which is located five miles southeast of Sharon. A 27-mile race was won by Logan Aviation Company's American Eagle, piloted by Leo Sherrick. Fifteen visiting planes registered during the day on which the meet was held.

Proceeds of the meet are to be devoted to the construction of a northeast-southwest cinder runway, 2,500 feet in length. Tile drained, this field is suitable for landing under almost any weather conditions. A mechanic and a pilot are on duty there at all times, and gasoline, oil and supplies are available.

MONESSEN AERO CORPORATION is developing a 145-acre flying field at Monessen. A hangar is under construction, and gasoline and oil are available. The roofs of several buildings in Monessen are marked.

VALLEY AIR SERVICE is operating an airline on the Allegheny River between Pittsburgh and points north as far as Oil City. A Waco-10, equipped with Edo floats for landing on the river and powered with a Whirlwind engine, is used over this route. By using a seaplane the company has the advantage of being able to receive and discharge passengers close to the business centers of the various cities where it stops. On the average, landings are made within four or five minutes of business centers. During the past summer, this plane operated from Canneaut Lake. T. Hubbard Morgan is manager and pilot for Valley Air Service.

THE Airport Equipment Division of the Maryland Metal Building Company, of Baltimore and Philadelphia, which handles all aviation and airport buildings of the company under the management of C. William Glose, is completing a 110-foot wide hangar at Bristol for the Keystone Aircraft Corporation, wherein the Patrican will be housed and assembled.

AN airport directional sign has been erected on the roof of the Westinghouse Electric and Manufacturing Company building in South Philadelphia. Three floodlight projectors with 1,000-watt lamps illuminate the sign at night. Visible from an altitude of several thousand feet, the sign indicates the direction to the airport, which is three miles distant.

THE Patrician, one of the largest passenger planes ever built in the United States, made its first trial flight on November 9 from the airport of the Keystone Aircraft Corp. at Bristol. Lt. Edwin McReynolds, inspector for the U. S. Air Corps, with Lt. Kenneth Fraser, test pilot for the company in the dual control cockpit, took the ship off on its first flight in ten seconds, with a load of five tons. Later the ship was flown over a measured course at a speed of 151.3 m.p.h.

Complete technical description and illustrations are published in the Technical Section of this issue.



Pilots and Keystone officials who witnessed the Patrician's trial flight.
Charles D. Koch, George Haldeman, C. L. Roloson, Clarence Chamberlin, Kenneth Lane, C. T. Porter, E. N. Gott and Lt. E. R. McReynolds.

Do You Need Money For Your Airport?

You often read of a community financing its airport by the public subscription method.

Why don't you do likewise?

An airport provided by gifts of thousands of citizens is not burdened with interest-bearing debts. It is free from future financial obligations. It stands as a testimonial to the progressive spirit of the community.

If your community needs money for the construction or development of your airport—

If you want it in the cheapest and best way—

If you want guaranteed interest and good will—

. . . . . We Can Help You

The airport division of Ward, Wells and Dreshman is prepared to assist you in raising funds for your airport needs by the accepted and proven popular-subscription plan.

Ward, Wells and Dreshman originated this highly specialized method and have employed it successfully in raising funds for civic and national movements of all descriptions. During the past twenty-three years members and associates of this firm have directed campaigns that have produced almost a BILLION DOLLARS for community chests, hospitals, churches, universities and other national and civic causes in the United States, Canada and Europe.

We will be pleased to consult with you and render complete service.

Airport Division

Ward, Wells and Dreshman

475 Fifth Avenue

New York

NEW YORK AIR NEWS

FOUR PT-3A planes, built for the Cuban Army Air Corps by the Consolidated Aircraft Corp. of Buffalo, were recently flown from Buffalo to Havana, Cuba. The 1,900-mile trip was made on a predetermined schedule. The planes were piloted by Capt. Jack R. Beam and Lieutenant Hodgson, U. S. Army Air Service instructors to Cuba, Captain Martull and Lieutenant Terry, the latter two of the Cuban Air Corps.

E. A. ILEMAN has become associated with the Consolidated Instrument Company of America, Inc., in the capacity of chief engineer. Mr. Ileman, who has long specialized in research and experimentation with instruments, will maintain headquarters in New York City.

Consolidated Instrument Company has established a test laboratory in New York City. This laboratory includes complete equipment for examining and testing Consolidated airplane and marine instruments.

THE Fairchild Airplane Manufacturing Corporation has purchased the minority stock interest in the Fairchild Caminez Engine Corporation of Mr. Harold Caminez and Mr. Leon Caminez, who have resigned as chief engineer and treasurer respectively of the corporation. Hereafter the activities of the two companies will be consolidated.

CANADIAN COLONIAL AIRWAYS inaugurated through service from Montreal to New York on November 12. The plane leaves Montreal at 12:15 p. m. and arrives at Newark airport at 4:15 p. m. Since October 1, when the Montreal service began, planes have been forced to stop at Albany because of darkness. However, arrangements have been made with Canadian postal authorities for an earlier dispatch of mail.

GENERAL AVIATION CO., INC., of Syracuse, has been active during the football season. In October the company transported five Colgate University students from Syracuse to Nashville, Tenn., where they witnessed the Colgate-Vanderbilt game. In November the Gain-A-Day Electric Co., arranged with General Aviation Company for fifteen representatives of its sales force to fly from Albany to Pittsburgh, Pa. While in Pittsburgh they attended the Pittsburgh-Syracuse football game, as did twelve others whom General Aviation Company had flown from Syracuse on the same day.

General Aviation Company, which is co-distributor of Stinson-Detroiter planes for New York, recently announced that Utica Flying Service, Inc., of Utica, and Veale Aviation, Inc., of Hazelton, Pa., have been appointed dealers for the Stinson line.

Long Island Aviation Country Club

AVIATION COUNTRY CLUBS, INC., recently announced the formation of the Long Island club. Charles L. Lawrance, of the Wright Aeronautical Corporation, was elected president. The club site, which will include a clubhouse and flying field, will be on the eastern edge of Westbury, L. I. The general design of the clubhouse will resemble an airplane, and this same design is to be used for the clubhouses of other aviation country clubs which are to be organized throughout the country.

Besides Mr. Lawrance, other officers of the club are: Edward O. McDonnell, vice president, and Chance Vought, secretary and treasurer. The directors are: Cornelius Vanderbilt Whitney, William H. Harkness, Henry P. Davison, R. L. Brooks, George M. Pynchon, Jr., William B. Leeds II, Oliver O'Donnell, and James B. Taylor, Jr.

BY recent arrangement Siemens engines, manufactured by the Siemens and Halske Company of Germany, are to be sold in this country directly by the manufacturer's representative. Dr. K. C. Frank, who is general representative in this country, has established a sales and service station at Curtiss Field, L. I.

A friendly arrangement was made with Mr. T. C. Ryan of the Ryan Aeronautical Corporation by which this company no longer handles the sale of the Siemens engines which, heretofore, have been advertised as Ryan-Siemens engines.

ANGOLA formally opened its airport with an air meet. Several well known pilots participated. The field is located on the Buffalo-Cleveland air mail route, about 22 miles from Buffalo. Covering an area of 139 acres, the field has 2,800-foot runways.

(*Continued on next page*)

AT THE CHICAGO SHOW

THE NEW

BROWNBACK

6 CYLINDER RADIAL AIR COOLED

ENGINE

Model C-400 Brownback Aircraft Engine, the first to be designed and built in America by the Brownback Motor Laboratories Organization, will be on exhibition at the Chicago Show, Dec. 1-9. Builders and users of light planes will find much of interest in this new, dependable power unit. Deliveries beginning March, 1929.

Brownback Motor Laboratories, Inc.

D-1038 Graybar Bldg., New York
Factory: Pottstown, Pa.
Pacific Coast: C. C. Ludlow, Los Angeles
Canada: Ericson Aircraft Ltd., Toronto

Say you saw it in AERO DIGEST

Buffalo
~the natural trading center

Seven Sound Reasons Why
Industries Grow and Prosper in the Buffalo District

1. **DIVERSITY FACTOR**
   80% of articles listed in U.S. Census of Manufactures are made in Buffalo District Industries.
2. **GEOGRAPHIC LOCATION**
   At the foot of the Great Lakes—the natural transfer point for lake and rail, air, canal and motor transport.
3. **ECONOMIC ASSEMBLY**
   Short hauls on raw materials —low freight rates.
4. **HOME-OWNING LABOR**
   Steady work—continuing wages—low turnover—result in 60% of workers owning their own homes.
5. **CENTER OF BUYING AREA**
   Within 24 hours of biggest buying population in Canada and United States.
6. **PLENTY OF POWER**
   At the very door of world's greatest source of power—Niagara.
7. **GATEWAY TO CANADA**
   75% of trade between United States and Canada moves through Buffalo - Niagara gateway.

Long years ago the trails of the pioneer traders met the canoe routes of the Indians at the foot of Lake Erie where today the air, land and water lines of transportation all meet at Buffalo.

Within two to twelve hours from Buffalo, depending on the mode of travel, live the seventy million people who make eighty per cent of the Nation's purchases.

In this trading area are 27 cities each with a population of 200,000 or more, and 51 cities of the 100,000 population class.

Radiating from Buffalo are thirteen main railroads, a half dozen major lake lines, all supplemented by canal, motor truck and air services in large measure.

Buffalo's warehousing facilities meet the most exacting requirements for storage capacity, speed in handling, and convenience in transfer between lake and land lines.

The low assembly and production costs of industry in the Buffalo district are backed up by ample, quick and economic distribution facilities.

Any one interested may have a copy of the new INDUSTRIAL ANALYSIS of the Buffalo district by writing to the

Industrial Department
CHAMBER OF COMMERCE
BUFFALO, N. Y.



One of a series of advertisements regarding the industrial advantages of the Buffalo District

(New York Air News continued)

LADY HEATH, who has won international fame by her aeronautical activities in England and the British colonies, arrived in the United States November 8. In this country she will fly a De Havilland Moth powered with a Gipsy 85-100 h.p. engine and hopes to further interest in flying among the women of America.

AN aircraft fabric section has been established by the William Whitman Company of New York City, Boston, Philadelphia and Chicago. It is the intention of the new section to re-enter the aircraft field, starting with a large production of grade "A" mercerized cotton airplane cloth, and to develop cloths for aircraft use, such as balloon fabrics and such other types as may be warranted by the demands of the aircraft industry. The company has control of the entire production of Nashawena Mills of New Bedford, Mass.

In 1917-1918 William Whitman Company supplied the United States Government with over ten million yards of grade "A" airplane cloth made in accordance with government specifications. During the post-war period the demand for this type of fabric was greatly reduced and the machinery was used for other work, until the present time when it has again been felt that the needs of the aircraft industry enable a large mill to start production.

The aircraft fabric section will be in charge of William P. Gaffney, who has long been concerned with the aircraft industry.

"Savoia Marchetti" Seaplanes to Be Built in America

THE American Aeronautical Corporation, sponsored by a group of men prominently identified with several leading American industries, has just been formed for the purpose of manufacturing the famous Savoia Marchetti seaplanes and amphibians. Savoia Marchetti seaplanes have aroused world-wide interest, during the past year, by the remarkable exploits of Commander de Pinedo, Major del Prete, Ferrarin, and many others.

Del Prete and Ferrarin crossed the South Atlantic in their Rome to Brazil flight, completing the total distance of 4,475 miles between these points, and establishing a record for non-stop flight.

The double hull monoplane type of Savoia Marchetti seaplane to be manufactured by the A. A. C. in this country, will be powered with two motors operating in tandem. This method of using motors has proven very efficient in Europe.

The daring rescue of Gen. Nobile, commander of the ill-fated dirigible *Italia* was accomplished by Com. Maddalena who flew in a Savoia Marchetti from Rome to Spitzbergen. In this flight Com. Maddalena spanned Europe, crossing the Alps at an altitude of over 9,000 feet— truly a magnificent feat which will be indelibly inscribed in the history of aviation.

An up-to-date factory with modern equipment will be erected on Long Island, covering almost 20 acres, for the manufacture of Savoia Marchetti commercial seaplanes accommodating as many as 24 passengers and built to withstand storms and rough waters. A three-place amphibian powered with a 110 horsepower motor will be one of the types produced.

NEW YORK AIR SHOW

NEW YORK CITY will join the ranks of American principalities holding aeronautical expositions when the New York Aviation Show opens there in the early part of February. This event will be held at Grand Central Palace from the 6th to 13th inclusive, and will be the first air exposition to be conducted in the metropolis since 1921.

The New York Aviation Show had its inception some months ago when Aviators' Post No. 743, American Legion, decided to sponsor and conduct a comprehensive and representative display of the latest types of aircraft, motors and accessories in order to bring the millions of people in the largest of our cities to the realization of the great advances which aviation has made in recent years.

The membership of Aviators' Post comprises more than 300 veteran airmen who served in the various flying units during the World War. From the membership a working committee has been appointed, known as the Post Exposition Executive Committee. Rex F. Gilmartin is the chairman and George A. Kent, treasurer. Acting in coöperation with these officers are Major Gordon Reel,

(Continued on next page)

FREE!

A GENUINE DOWAE STUNT PLANE

With every new or extended year's subscription.
Fun and training for everybody—from 9 to 90!

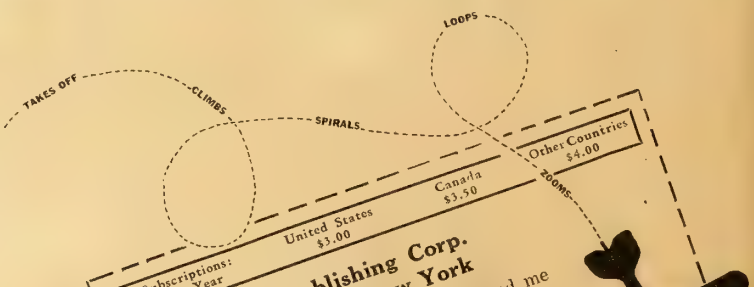
Anyone can fly it——Everyone will enjoy it

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MAIL your new or extended subscription promptly. If you want to send the plane to some kiddie friend, just furnish the address. Each model is securely packed and insured against loss or breakage. Fill out the coupon and mail at once with check or money order for $3.00. The plane will go forward at once.



If you want to make a Christmas Gift of the Dowae Plane we suggest that you send in the coupon at once.



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220 W. 42nd St., New York

Enclosed is ..... Please send me AERO DIGEST every month for one year together with my Dowae Stunt Plane.

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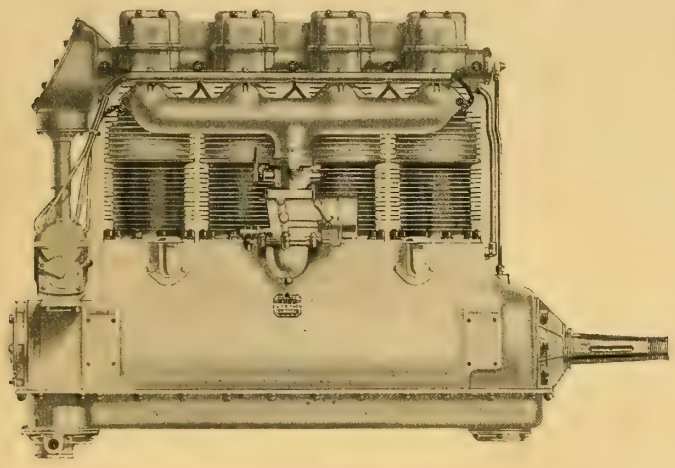
4 -IN LINE- SCORPION AIR COOLED
REGISTERED TRADEMARK

AERONAUTICAL PRODUCTS
CORPORATION
MANUFACTURERS
NAUGATUCK, CONN., U.S.A.

The Aeronautical Public—

Gentlemen:

Here it is---our new 4 cylinder-in-line, air-cooled, "Scorpion". 100 H.P. plus, at 1800 R.P.M.--and it weighs only 290 pounds. The "Scorpion" may be installed in any type of plane now being used.



Bore $4\frac{5}{8}$", stroke, 5". Two Bosch Magnetos. Zenith Carburetor. Inertia Starter Overhead Valve, camshaft rockers and our patented cantilever springs completely enclosed. Salt filled exhaust valves. Force feed oiling system with dry sump. Steel forged cylinders with fins milled out of the solid. Cylinder barrel screwed into aluminum alloy head with aluminum bronze valve seats. Power and Assurance.

Yours very truly,

AERONAUTICAL PRODUCTS CORPORATION

Henry J. Thomson

President

ALL MATERIALS U. S. AIR SERVICE REGULATIONS

QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE. ALL AGREEMENTS CONTINGENT UPON STRIKES, ACCIDENTS AND OTHER CONDITIONS BEYOND OUR CONTROL

(New York Air News continued)

The various exhibits at the Grand Central Palace will be divided into three main classifications; general aircraft displays, including planes, balloons and accessories; airport equipment; educational and historical material and data.

The first of these classifications will bring together the different types of planes, including transport, taxi, sport and military planes and balloons. The second classification will bring together the latest improvements in supplies and outfittings for aircraft and airports; and the historical and educational exhibits will include data, photographs, motion pictures, aircraft models, and displays showing the evolution of aeronautical science. The application of the science of radio to aeronautics will also receive a place of prominence in the New York Aviation Show.

ALBANY AIR NEWS

By H. F. Wood

CONSTRUCTION of a $50,000 hangar at the Albany airport will be started shortly by the Colonial Airways System to house planes in service on the Albany-Cleveland and the New York-Albany-Montreal runs. A site, 200 x 400 feet in dimensions, has been leased.

Grading of the Albany airport is now in the final stages and more than half of the 235-acre tract has been seeded.

THE New York State Aviation Conference held its second annual meeting at City Hall, Albany, November 22nd. A speaking program was arranged by the president, Mayor Charles G. Hanna of Syracuse.

IN conjunction with the Albany *Times-Union*, Flyers, Inc., Albany flying school and service, is conducting an essay contest with a complete flying course offered as first prize. The title stipulated for essays submitted is "Why I want to learn to fly". The contest is in charge of Bert Mabrey, who, with Pilots Ted Burke and Warren J. White, will act as judge.

In a tie-up with Albany merchants, Flyers, Inc., recently instituted an air express service between Curtiss Field and the Albany airport.

DR. TIEN LAI HUANG, whose activities in aviation in China have earned him the title of "The Chinese Lindbergh", recently included the Albany airport as a stop on his good-will flight throughout the United States. He was flying a blue and gold Stinson monoplane, bearing the name *The Spirit of Canton* in Chinese characters.

Dr. Huang, a graduate of Syracuse University and a leader in the Chinese Nationalist party, plans on establishing schools at Detroit and Lansing, Michigan respectively, where young Chinese can learn to fly. Later he intends to institute similar courses in China.

He is being accompanied on his flight, which is being made from east to west with stops at all large airports, by Donald Starr, co-pilot, and Jack Byrne, mechanic, both of Grand Rapids, Michigan.



The Goodyear "Puritan" at Newark Metropolitan Airport

UNDER the direction of John W. Park, Albany school principal and former war flier, a night ground school has been instituted by the Albany Air Service.

THE fifth in the United States to be so designated, the Albany airport has been made an official port of entry by the Department of Labor. William Scott, deputy collector of customs for the Albany district, who has been assigned to look after the clearing of all aircraft, visits the port twice daily, on the departure and arrival of Canadian Colonial Airways planes.

WESTERLO ISLAND, located by the Hudson River and Albany's original flying field, has now been officially abandoned to allow for the development of the deep sea port project. The original superintendent, Joe Fitzgerald, however, is still very much in evidence, now as the manager of the new $500,000 airport on the Shaker farm.

NEW JERSEY AIR NEWS

THE contract for the planning and construction of the Central Airport at Camden has been awarded to Black and Bigelow, Inc., air transport engineers of New York City. The airport is to be constructed on a 184-acre tract, four miles from Philadelphia. Harold F. Pitcairn, C. T. Ludington, C. M. Keys and N. S. Ludington are among those backing the project.

TWO new hangars at the Atlantic City airport are nearing completion. These hangars, each of which will measure 112 by 116 feet, are being constructed of steel girders and sheet steel plates. The Atlantic Construction Company has the job. The city commission recently contracted for an additional fill-in of 215,000 cubic yards on which will be constructed three new gravel runways.

AT Freehold a smoke stack over 100 feet in height has been lighted to aid night fliers. About 12 miles northeast of this stack, the Airview Flying Service has erected a rotating beacon at Red Bank. This light is mounted on the company's hangar.

NEWARK METROPOLITAN AIRPORT

THE initial unit of the Newark Metropolitan Airport, comprising about one half of the entire airport, was opened on October 1 to planes serving the metropolitan district, and the United States Government began to formulate plans to transfer air mail operations there from Hadley Field, N. J. When these changes are completed, planes will operate on a daily schedule to and from Boston, Montreal, Chicago, Cleveland, Atlanta, Miami, New Orleans, Mexico and California.

Included among the lessees of hangars are the Colonial Air Transport, the Canadian Colonial Airways, the Standard Oil Company of New Jersey, and the Newark Air Service.

A lease for 50 years at a yearly rental of $1.00 has been granted to the New Jersey National Guard by the Newark City Commission. The unit to use the field will be the Aviation Branch of the 44th Division of the New Jersey National Guard, including the 119th Observation Squadron, the 119th Medical Section and the 119th Photographic Section. Lieut. Kellog Sloan of the U. S. Army has been assigned to take care of the Guard area at the airport.

In addition, the United States Air Transport, Inc., uses the airport as its northern terminus for the Washington-New York airline. Planes in this service leave Washington at 9 a. m. and arrive at the airport at 11:15 o'clock. On the southbound route the ships leave at 2 p. m. and arrive at the Washington airport at 4:15 o'clock.

In the first unit completed there are two runways in the form of a cross, each arm of which is 2,000 feet long and 800 feet wide. Down the middle of each arm run specially constructed paths of tar-bound pavement. Their arrangement is such that incoming and outgoing machines may take advantage of whatever wind prevails.

Two banks of floodlights, one with twelve lights, the other with ten, and a 24-inch revolving beacon atop a 34-foot temporary tower have already been installed and are in use for night service. Each of these lamps is lighted by 1,000,000 candlepower, and the beacon by 5,000,000.

All nearby wires and cables have been placed underground, and any smoke stacks, water towers and tanks in the vicinity of the field have been illuminated.

FOR SALE

AT A SACRIFICE!

FOUR STANDARD BELLANCA MODEL CH PLANES

TWO ARE NEW

TWO ARE EQUAL TO NEW

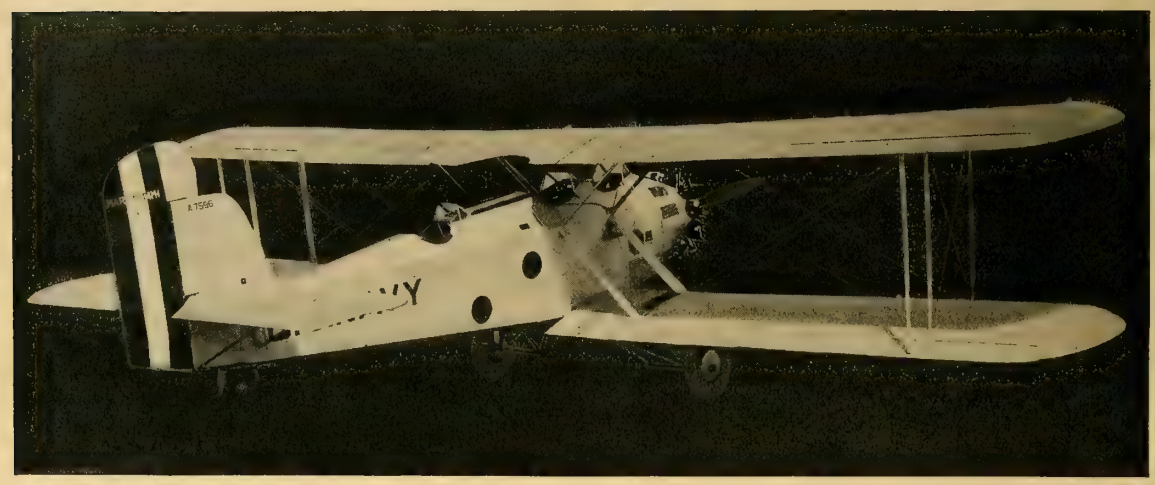
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2008 Fisher Building
Detroit, Michigan

Say you saw it in AERO DIGEST

At the Chicago Show



An Invitation...to Visit the World's Finest, Most Modern Aircraft Factory

IN addition to assurances of a royal welcome to all trade visitors at our exhibit in Chicago, or our show headquarters at the Lake Shore Athletic Club, we extend to them a hearty invitation to visit our Cleveland plant at any time. Here it will be possible to see in actual operation the advanced methods of aircraft manufacture that mean uniform quality without excessive cost—the broad engineering facilities that have already contributed so much to the advancement of aeronautics. You will see the most complete equipment in the industry for the treatment and fabrication of duralumin. And you will see and learn many other things which will convince you of our ability to carry out our pledges to the trade and the public in the fullest measure.

Our plant is located at 16800 St. Clair Avenue, a half-hour's drive from the business center of Cleveland. For those who wish to drop in on us via the air, we have an excellent private landing field with hangar facilities. We trust that all our friends in the trade, old and new, will find it convenient to visit us at the earliest possible date. We feel that we have something to interest everyone, regardless of his capacity or connection with the trade.

C. F. Van Sicklen
Vice-President and Director of Sales



The Famous "MARTIN BOMBER"

Now Available For Commercial Use

The illustration above shows a Martin "74" Bomber, a duplicate of which, completely uncovered, will be on exhibition at the Chicago show through the courtesy of the Bureau of Aeronautics, U. S. Navy Department. This ship, with a wing spread of 53 feet and powered with a 525 H.P. radial air-cooled engine, weighs only 3,850 pounds and will lift approximately its weight in pay load while maintaining a high standard of speed and maneuverability. It will be available commercially as a remarkably efficient carrier of mail, freight and passengers. Several different fuselage arrangements will be provided to fit all needs. A smaller model, adaptable for either training or cross-country purposes, will be shortly announced.

The opportunity to purchase for commercial uses a type of ship which has met U. S. Navy standards with so wide a margin of satisfaction, should appeal to all operators of transport lines. The prices, when announced, will be considered most reasonable by all. Judged from whatever standpoint, the Great Lakes Line, carrying on standards that have led since the earliest pioneer days, offers the utmost in reliability, safety, and pay-load performance. Inquiries from all commercial and military sources are cordially invited.

..You Will Learn *the* Remarkable Facts *About* * GREAT LAKES *Aircraft*

AIR transport operators, aircraft distributors, flying school proprietors, and all close followers of aviation will welcome the coming opportunity to acquaint themselves with all facts behind the new name which has flashed across the aeronautical horizon—Great Lakes Aircraft Corporation. Ever since the announcement that heralded the transfer of the Glenn L. Martin plant at Cleveland into these strong new hands, the entire industry has sensed great developments in store for the future. The information and exhibits which have been prepared for the International Aeronautical Exhibition at Chicago, December 1st to 10th, 1928, will disappoint no one, however high his expectations may be.

Visitors to the Great Lakes exhibit, located in the First Regiment Armory, will have an opportunity to inspect one of the finest examples of aircraft design and construction ever placed on view. The Martin "74" Navy Three-Purpose Bombing, Torpedo, and Reconnaisance Plane, powered with Pratt & Whitney "Hornet" engine, is the culmination of twenty years of experiment and research, coupled with production standards of the highest efficiency. The result from an engineering viewpoint will amaze the most experienced observers. The performance, now a matter of record with the U. S. Navy Department, is destined to revolutionize all present commercial standards.

In addition to this ship and others shortly to be announced, we offer an all-duralumin U. S. Navy standard seaplane float that is a marvel for lightness and seaworthiness. We also offer the most elaborate facilities for the manufacture of duralumin parts of all sorts. Examples of interest to all manufacturers will be on display at our exhibit. Learn the remarkable story behind this great new-old company and its products. What you will see and hear will convince you that Great Lakes has much to offer to the entire industry.

MILITARY . . . NAVAL . . . COMMERCIAL AIRPLANES
SEAPLANE FLOATS . . . DURALUMIN PARTS

GREAT LAKES AIRCRAFT CORP.

CLEVELAND, OHIO

* Great Lakes Aircraft Corporation is a manufacturing concern founded upon and continuing the finest traditions in aviation history, having acquired the Cleveland plant, tools, and design and patent rights of the Glenn L. Martin Company. This business, built up by Mr. Martin over a period of twenty years, will be expanded and continued virtually intact by the new management. Realizing fully the responsibility that this task involves, we have pledged our faith with Mr. Martin to maintain, and improve wherever possible, the high standards of engineering and manufacturing for which his name has ever stood. We renew this pledge to the entire aviation industry, which act automatically guarantees the highest measure of quality, dependability, and value to be built into all aircraft and parts bearing the Great Lakes seal.

OHIO AIR NEWS

By T. E. Lunsford

NINE midwest aviation companies have banded together in a $6,000,000 merger and will put into effect, among other things, the proposed new passenger-merchandise route between Dallas, Texas, and Columbus, Ohio. The companies are operating airlines which cover more than 4,000 miles. They include the Universal Air Lines, Inc., operating between Cleveland, Chicago, St. Paul and Minneapolis; Robertson Aircraft Corporation, operating from St. Louis to Chicago and Omaha; Northern Airlines, operating from Minneapolis to Duluth and from Minneapolis to Fargo, and six smaller companies.

B. C. Irwin has been elected president of the newly-organized Delaware Aero Club. J. P. Davis is vice president; C. A. Eccles, treasurer, and Earl Lazear, secretary. Twenty-five men comprise the charter membership of the club, which plans to lease a landing field, build a hangar and purchase a plane.

THE proposed bond issue of $850,000 for the purpose of building a municipal airport in Columbus was approved by the voters at the recent election. Engineers on City Engineer Simpson's staff have commenced topographical survey work on the site, which includes 1,000 acres on the James Pike, just north of the army reserve depot. Ex-Mayor George J. Karb was chairman of the metropolitan airport committee of 300, which labored strenuously during the past month to place the proposition before the voters.

THE War Department has allotted $20,728 for installation of a fuel and water system for the army airport at Wright Field, Dayton.

THE Canton City Council has again voted $75,000 for the purpose of financing a flying field. This leaves the status of the airport project practically the same as on the other two occasions when council passed on ordinance for the purchase of a site only to have it vetoed by the mayor. One attempt to pass it over Mayor Curtis' head failed.

THE world's two largest dirigibles, which are to be constructed for the United States Navy at a cost of $8,000,000, will be built in Akron, it has been announced by Paul W. Litchfield, president of the Goodyear-Zeppelin Corporation.

The immediate availability of a supply of skilled labor and the coöperation received by the city led to the selection of Akron. Construction of the hangar for the dirigibles will start as soon as the city provides an airport. The ground for the airport already has been obtained at Fulton Field, and a $900,000 bond issue has been provided for its improvement.

SYCAMORE is to have a new airport. M. I. Ankley, automobile dealer, and M. I. Glazier, lumberman, state that a Swallow biplane has been purchased and that an experienced pilot will be employed to instruct students. A 40-acre tract has been leased for the landing field.

CHARLES MEYERS, chief test pilot for the Advance Aircraft Co., of Troy, has resigned to accept a position with the Great Lakes Aircraft Co. of Cleveland.

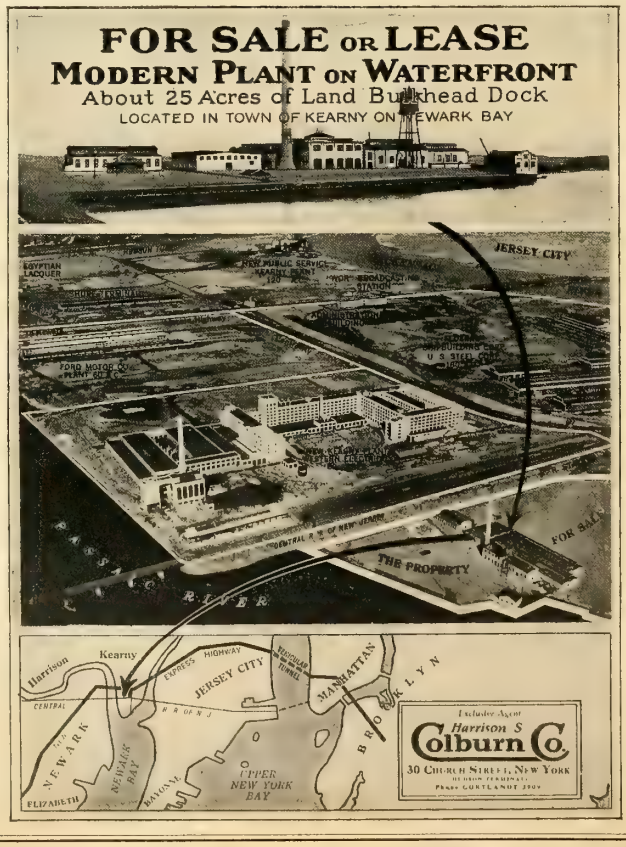
The Great Lakes Aircraft Co., was recently organized by C. F. Van Sicklen, former sales manager of the Advance Aircraft Co., and has purchased the Glenn L. Martin plant. Mr. Meyers will be engaged in both engineering and flying work with the new company, his work being somewhat similar to what it has been with the Troy concern.

MORE than 150 Champion Spark Plug salesmen assembled from all parts of the country for a four-day sales conference at the factory in Toledo, November 19-23.

The entire sales force journeyed to Detroit to study the manufacturing processes at the Champion Porcelain Company, where all Champion sillimanite cores—more than 1,000,000 a week—are made.

NINE newspapermen attended the first short course in aviation presented by the Embry-Riddle Company at Lunken Airport, Cincinnati. The course consisted of lectures by Don Griffith, T. H. Embry and C. E. Planck. Planes in the process of construction, engines, fuselages, landing gears, wing curves, etc., were exhibited and explained. Major Robert L. Rockwell, flying a Waco-10, demonstrated numerous aerial maneuvers.

(*Continued on next page*)



Just the Location for

MANUFACTURE OF AIRPLANES and SUNDRIES

1. Excellent Labor
2. 70,000 sq. ft., Good one-story buildings
3. Close to new Newark Airport
4. 25 acres Land—with good exposure to prevailing westerly winds
5. 2,000 ft. frontage on quiet waters of Newark Bay
6. Railway Passenger Station and Siding on Property
7. 20 Minutes to Manhattan by new Vehicular Tunnel—Best of highways
8. Immediately available

Send for this Special Folder No. 22

Harrison S. Colburn Co.

30 Church Street, New York

(Hudson Terminal)

Telephone: Cortlandt 3909

The MONO-AIRCRAFT Line Points the Way for 1929



New Achievements in Performance and Value

The Monocoupe

THE ULTIMATE PLANE FOR THE PRIVATE OWNER

Setting the style in modern, enclosed aircraft for the sportsman and the person seeking safe, economical transportation, this sturdy plane with its high factor of safety and ease of control has successfully captured the prize money in all air meets for efficiency in which it has competed. Over two hundred Monocoupes are in daily service and have done more to bring flying to the private owner than any other airplane of any make.

The coming year will see hundreds more of this finely built plane in the air.

Orders are being accepted far in advance. Price $2675. Flyaway at Moline, Ill.

The Monocoach

FLYING IN THE INTEREST OF BUSINESS

A four-place cabin plane, modern to the last degree, adequately powered by the new Velie nine-cylinder, air-cooled radial of 180 h. p.

The plane is offered to business concerns or the field operator at about half the cost of the slightly larger cabin planes and at about the same price of the conventional, three-place, open biplanes equipped with new production motors of less h. p.

Those familiar with the market predict the Monocoach the best selling plane for the coming year.

Price $6500. Flyaway at Moline, Ill.

The Monoprep

FOR ECONOMICAL TRAINING

A two-place, open, side by side, high wing monoplane that can be operated at $1.00 per hour for fuel. This slow landing, rugged training plane has plenty of room, unexcelled vision in all directions, wide landing gear—built throughout for hard service and continual operation. The Monoprep is the answer to aviation's greatest need for next season.

It will permit schools to charge less for instruction and still show longer profit.

Price $2675. Flyaway at Moline, Ill.

The Mono-Aircraft line carries the most comprehensive 100% guarantee on both plane and motor that is known to the industry

MONO-AIRCRAFT, *Inc.*

Builders of the Monocoupe, Monocoach and Monoprep

MOLINE, ILL., U. S. A.

(Ohio Air News continued)

THE Embry-Riddle Company of Cincinnati has organized a speaker's bureau on aviation topics. This bureau can furnish speakers on the various aspects of flying to clubs, schools and organizations, within a radius of 100 miles of Cincinnati.

CINCINNATI MUNICIPAL AIRPORT

WORK on the development of Cincinnati's municipal airport is to be undertaken immediately. The city has voted a $500,000 bond issue for this purpose. The airport is to consist of a tract of land three miles square, located at the confluence of the Little Miami and Ohio rivers, about 20 minutes from the postoffice. Lunken Airport now occupies about one fifth of this area.

Construction of a dike to withhold flood waters will begin soon. Three hangars and a shop are to be erected during December.

According to present plans, an administration building with many modern airport facilities is to be built. The Embry-Riddle Company plans to construct a building for its flying school.

THE Champion Sparkers, popular radio feature for the past three winters, are on the air each Thursday evening over the Blue Network of the National Broadcasting Company at 8:30 to 9:00 o'clock, Eastern Standard Time. W. H. Haenschen, who has directed the Champion Sparkers since their initial program, again handles the baton and has a larger orchestra than in the past seasons. The Champion Sparkers are sponsored by the Champion Spark Plug Company of Toledo, Ohio, and Windsor, Canada.

COLUMBUS AIR NEWS

By FRANK A. PETRIE

WHAT is believed to be the first attempt by an American newspaper to determine the practicability of delivering its regular editions to its suburban circulation area, was made by the *Columbus Dispatch* during the week of October 29-November 3.

During the week, the newspaper delivered more than 15 tons of its regular editions to readers living within an 80-mile radius of the city, particular attention being paid to those localities where motor bus and train transportation afforded the greatest difficulties in getting papers to readers in a short time. Thirty towns were on the schedule, and at eight of these it was necessary to make delivery by parachute since the hilly locality afforded no adequate landing fields. Record time was made in delivering the papers.

CLEVELAND AIR NEWS

By DAVID E. IRWIN

THE airplane plant of Glenn L. Martin here has been sold to a syndicate of bankers and is to remain in Cleveland for the manufacture of commercial planes. The company, to be known as the Great Lakes Aircraft, Inc., is to begin production immediately. William Robert Wilson, president of the Guardian Trust Co. of Detroit, is chairman of the board of the new company.

The Great Lakes company will manufacture the Martin models 74T4-1, 74T4-2 and the SC types.

The Martin company will establish a new plant on the Atlantic Seaboard.

C. W. MARCH, hangar manager of Thompson Aeronautical Corp. here, has been transferred to the Michigan division of the company. His place has been taken by Herbert E. Smith, Jr., formerly sales manager for T. A. C. in Cleveland.

PLANES of National Air Transport on the Cleveland-New York leg of the transcontinental air mail, are to be equipped with devices to record the conditions at which ice forms on the wings of planes.

GLOBE COUPON INSTRUCTION BOOKS

THE use of coupon books offers one means of systematizing flying instruction. Such coupon books, recently introduced by the Globe Ticket Company, are of value both to the company offering instruction and to the student. They enable the flying school to keep an accurate record of instructing time for each individual, as well as for the entire enrollment, and afford an additional check on income. The student knows, by referring to the coupon book, how much time he has already received and how much time he still has before him.

IT IS SIGNIFICANT
that more than
THIRTY ENGINE MANUFACTURERS
HAVE SELECTED
SCINTILLA
AIRCRAFT MAGNETOS
for their ignition equipment
DEPENDABILITY
SIMPLICITY
ACCESSIBILITY
SCINTILLA MAGNETO COMPANY
Sidney, New York
Contractors to U. S. Army and Navy
Say you saw it in AERO DIGEST

THE NEW SWALLOW TRAINING PLANE

2 PLACE TANDEM
DUAL CONTROL

$1795.

LESS MOTOR AND PROP

DETACHABLE MOTOR MOUNT

USE YOUR OLD OX-5'S OR ANY MOTOR UP TO 110 H.P.

STUDENT'S RUDDER AND STICK RELEASE



VISION 100%

PERFORMANCE
WITH OX-5 MOTOR FULLY LOADED
IN TEN MILE WIND

TAKE OFF - 6 SECONDS - 150 FT.
LANDING ROLL - 7 SECONDS - 150 FT.

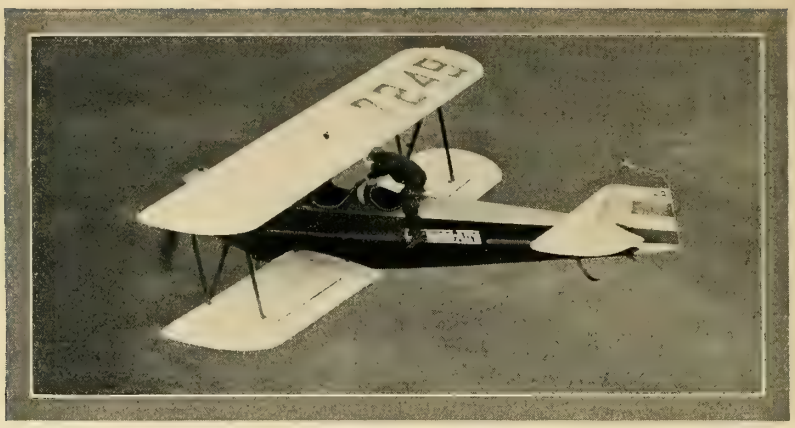
IT'S here at last—and SWALLOW produced it .... It's the new SWALLOW T-P, the long looked for plane in which to reach and teach the masses to fly. It's ideal—they learn to fly in half the time .... It's price is as sensational as its performance. Learn all about it at our exhibit .... But you won't believe it till you see it fly at the daily demonstrations which we are holding during the Show.

We seek contact with desirable territory sales representation. See us at the Chicago exhibit.

"Follow the Swallow"

THE SWALLOW AIRPLANE CO.

WICHITA, KANSAS



Vermilya demonstrates the Command-Aire's stability by stepping out of cockpit

CHICAGO AIR NEWS

By Duke Jordan

TROWEL POST No. 160 of the American Legion is the first in Chicago, and one of the first in the United States, to own its own airplane, an Eaglerock.

UNIVERSAL AIRLINES, INC., whose new hangar is under construction at the Municipal Airport, is planning a roof garden which will enable passengers and visitors comfortably to watch the arrival and departure of planes. It is planned to serve refreshments on the roof garden. The new hangar will be the largest commercial hangar at the municipal airport. It will have a frontage of 200 feet and a depth of 100 feet.

NORTHWEST AIRWAYS, air mail contractor between the Twin Cities and Chicago, has been given the lowest insurance rating of any aviation company, officials of the organization declare. Having flown over 500,000 miles and having carried thousands of passengers, none of the Northwest ships has suffered a serious accident.

DOUBLE the present amount of space for handling air mail at the Municipal Airport will be available with the completion of an addition to the airport postoffice building. Air mail contractors who carry mail out of Chicago are financing the construction of the addition.

AIR transportation played an important part in the International Travel Show at the Sherman Hotel, November 11 to 18.

WINTER commuters between Chicago and Florida will be able to save considerable time this year when the Interstate Airlines extend service through to Miami after December 1st. Service to Evansville, Ind., started last month.

PROMOTION of aviation throughout the United States will be the object of an educational campaign sponsored by officials of the Kiwanis international organization in coöperation with 1,750 local clubs, it was announced here by Howard S. Smith, former army flier and past governor of the Ohio Kiwanis district.

THE writer is editing a new aviation column, called "Airport Airings", in the Chicago *Daily Journal*. The feature appears twice weekly.

CHICAGO will be the central terminal for a new service which will provide direct airline connections between Minneapolis-St. Paul and the eastern seaboard, according to Louis H. Piper, president of the Universal Aviation Corp. Two passenger lines connecting Chicago and the Twin Cities and Cleveland are operated by Universal.

THE Cleveland-Louisville route schedule has changed from day to night service. Lighting on this route has been completed.

ROBERTSON AIRCRAFT has announced a change in its passenger schedule. Ships leave here at 9:30 a.m. and arrive in St. Louis at 12:30 p.m. Ships leave St. Louis at 3:30 p.m., arriving here at 5:30 p.m.

AIR ACTIVITIES, INC., has leased land for the establishment of an aviation company in Du Page county, a mile northwest of West Chicago. Officers of Air Activities are: Ayres Boal, president; Harry C. Edmonds, vice president; Laird Bell, treasurer; and Stuart Templeton, secretary. C. R. Borkland will be general manager of the air school, which will be temporarily housed in some farm houses on the property. Work is to start at once on a hangar, 60 x 170. The school will commence operations next spring.

WITH stores located in more than thirty cities between the Mississippi River and the Atlantic Seaboard, the Walgreen Drug Store Company has purchased a Sikorsky amphibian so that officials of the company may maintain closer contact with the various units in those cities. This plane, which is powered with two 410 h.p. Wasp engines, was recently flown by Captain Berry and Ira Biffle from the Sikorsky factory on Long Island to Chicago. Mr. Biffle is to be the regular pilot for the Walgreen company.

Stability Test—Not Stunt

CHICAGO got a breath-taking thrill last month when Capt. Wright (Ike) Vermilya, chief test pilot of Command-Aire, Inc., crawled out of the cockpit of his plane and rode the fuselage while the ship was flying at an altitude of 1,000 feet above the city. Newsreel and newspaper camera men were taking "shots" from an accompanying plane. The news interest of the feat rested on the fact that Vermilya was the sole occupant of the plane, which continued to glide along on an even keel with no one at the controls.

The newspapers played up the feat as a daredevil stunt, leaving out of their stories the flier's insistent assertion that the exhibition was more a matter of good sound engineering than nerve.

"The credit for the stunt really belongs to Albert Voellmecke, the young German aeronautical engineer who left the Heinkel factory in Germany to become chief engineer for Command-Aire a little more than a year ago," said Capt. Vermilya. "It was Voellmecke's slotted aileron that made the feat possible."

This device is said to give the ship a remarkable degree of stability and ease of control and also to permit landing at a speed considerably lower than has heretofore been possible. With this new type of aileron, the manufacturers claim, it is virtually impossible to spin the ship.

Section of Chicago-Atlanta Route Opened

INTERSTATE AIRLINES, INC., which is to operate the air mail and passenger route from Chicago to Atlanta, began passenger service on the first section of the route on November 10 and air mail service on November 19. This first section is between Chicago and Evansville, Ind., with stops at Champaign, Ill., and Terre Haute, Ind. (A complete time table and rate schedule of this section is published in this issue of Aero Digest under "New Airline Routes and Schedules.")

According to present plans, the line will be extended to Atlanta on December 1. Subsequently, Interstate Airlines will operate spur lines from Evansville to St. Louis and Louisville. When the route has been completely lighted next spring, night air mail service will be inaugurated. The company has purchased a fleet of Fairchild cabin monoplanes, powered with Pratt and Whitney Wasp engines, for use on this new service.

NIGHT pilots flying over the Chicago industrial districts on the south shores of Lake Michigan have a new landmark to guide them. The new 300-foot concrete chimney at the Buffington, Ind., plant of the Universal Portland Cement Company is brightly illuminated to make it visible for many miles. Instead of the ring of red lights commonly used to mark the top of an obstruction to aircraft, specially constructed floodlights here bathe the stack from top to bottom with a white light. The sides of the chimney most brilliantly lighted are those in line with the main path of air travel from Chicago to the east.

(*Continued on next page*)

SAFEST *in Flying*



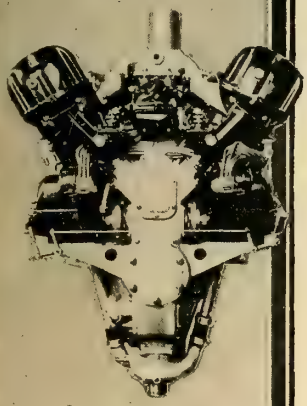
CHEAPEST *in Service Cost*

MICA SPARK PLUGS

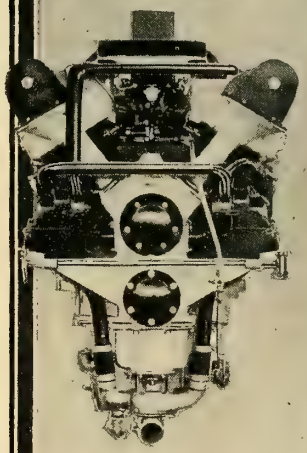
have played their part in writing Aeronautical history. Some of the noteworthy triumphs in which B-G Mica Spark Plugs proved their dependability are:

Army Round-the-Rim Flight.
Army Round-the-World Flight.
Winner, Mitchell Trophy Race, every year.
Winner, Schneider Cup Trophy Race, 1923-1925-1926.
Winner, Pulitzer Trophy Race, every year.
Winner, National Air Tour, 1927-1928.
Army, "Good Will" Flight.
Winner, Mason M. Patrick Trophy Race, every year.
Winner, the Dole Flight Oakland to Honolulu.
Winner, Transcontinental Air Derbies, 1927-1928.
PN-12 Navy Plane Endurance and Altitude Record.
Lt. C. C. Champion U.S.N., World's Altitude Record.
Capt. George Wilkins' North Pole Flight.
Kingsford-Smith California to Australia flight.
Mears-Collyer Round-the-World Expedition.
Art Goebel's Los Angeles-New York Nonstop Flight.
Commander Byrd's South Polar Expedition.

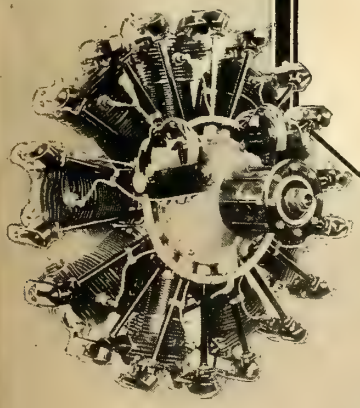
B-G CORPORATION
136 W. 52nd St., New York City.



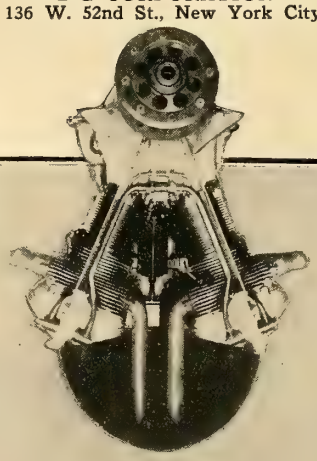
Curtiss "D-12"



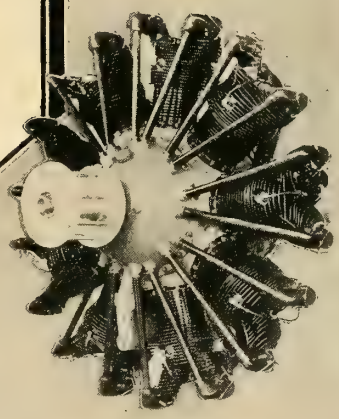
Packard "2500"



Wright "Whirlwind"



Inverted Liberty Air-Cooled



Pratt & Whitney "Wasp"

(Chicago Air News continued)

THE "EARLY BIRDS"

THE "Early Birds", an organization which will consist of those who entered aviation during the first thirteen years of flight (1903-1916), will hold its first meeting at Chicago on December 3, during the international air show. A constitution and by-laws will be adopted, officers elected, and policies determined at the Chicago "migration", as it is termed.

Some of the old-timers who have already signified their intention of joining the "Early Birds" are: A. Livingston Allan, J. Edward Barnhart, Caleb S. Bragg, Clyde V. Cessna, Virginius E. Clark, Frank T. Coffyn, Parker D. Cramer, Glenn H. Curtiss, Earl S. Daugherty, Charles H. Day, Richard H. Depew, Jr., Laurence L. T. Driggs, B. W. Fawcett, Brig. Gen. B. D. Foulois, Ivan R. Gates, Lewis E. Goodier, Jr., Edgar S. Gorrell, George A. Gray, Harold E. Hartney, B. R. J. Hassell, Beckwith Havens, E. A. Johnson, Robert R. Johnson, Ernest Jones, E. M. Laird, James V. Martin, Major T. DeW. Milling, P. G. B. Morriss, Fairfax Naulty, Earle Ovington, Will D. Parker, Samuel S. Pierce, Augustus Post, Capt. H. C. Richardson, Howard M. Rinehart, Walter J. Shaffer, B. Russell Shaw, Igor Sikorsky, Marjorie Stinson, William T. Thomas, Otto W. Timm, Commander John H. Towers, Clifford Van der Voort, L. A. Vilas, Waldo Waterman, Charles F. Willard, Capt. Hugh L. Willoughby, C. C. Witmer, J. B. Witt.

ILLINOIS AIR NEWS

WHILE a fleet of airplanes circled above Riverside cemetery at Moline, Ill., October 26, funeral services were held in honor of W. L. Velie, Sr., nationally known aircraft and automobile manufacturer. Mr. Velie's death occurred unexpectedly two days before, from a heart attack.

The accession of Mr. Velie to the list of aircraft builders had created some comment lately, owing to his long record as a carriage and then automobile manufacturer, extending back 40 years. He was a grandson of John F. Deere, the original steel plow manufacturer, who established his factory in Moline before the Civil War and made it a plow-making center.

Mr. Velie was president of Mono-Aircraft, Inc., makers of the Monocoupe and Monocoach and Velie engines.

AT the regular election of officers of the Bloomington Flying Club in October, Charles A. Zweng was chosen president; Davis Merwin, vice president; Charles O'Malley, treasurer; and Jack Bell, secretary. The club recently erected a hangar and is now building a service shop at Bloomington Airport.

THE Egyptian Airways Division of Universal Airlines, Inc., at Marion, has added two instructors to its school of flying. A new hangar, measuring eighty by two hundred feet, is now under construction.

IOWA AIR NEWS

By R. W. MOORHEAD

THE Waterloo-Des Moines air express was inaugurated on November 12, which gives one hour service daily, except Sunday, between the two Iowa cities.

The plane leaves Waterloo at 8 a.m. and returns at 4 p.m. John Livingston, president of the Midwest Airways, Inc., is operating the passenger service. Oran P. Harwood, licensed pilot and manager of the Waterloo airport, is the pilot.

With the inauguration of the new service, Des Moines has three major air transport and passenger carriers operating from the municipal airport.

The Boeing Air Transport Company, now carrying air mail and passengers, leaves Des Moines' air field daily for points both east and west.

The Yellow Cab Airways passenger service company operates several passenger planes for special trips.

CRAM AIRPORT

WITH thirty-five airplanes, including eighteen army planes and two navy planes, ceremonies dedicated Cram airport at Davenport on November 12, while some 25,000 persons were present at the field to combine the dedication ceremonies with the Armistice day celebration.

Col. D. M. King, commandant of the Rock Island arsenal, made the address of the day, and announced that the field

(Continued on next page)

CONSTRUCTION
OF MULTIPLE-ENGINED
METAL AIRPLANES INCORPORATING
DESIGN FEATURES OF THE BURNELLI TYPE

BURNELLI TYPE AIRCRAFT

V. J. BURNELLI

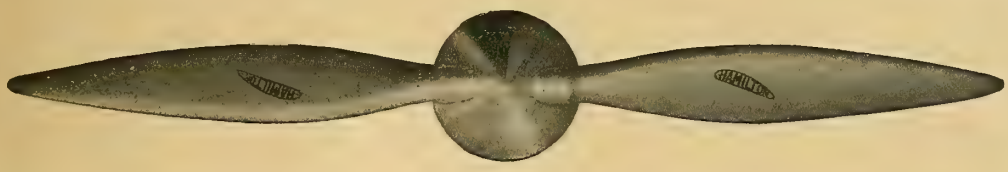
AIRCRAFT CONSTRUCTION

Factory:
Keyport
New Jersey

Office:
247 Park Ave.
New York City

Say you saw it in AERO DIGEST

TURNING PERFORMANCE INTO ACHIEVEMENT



IT has never been the aim of the Hamilton Aero Mfg. Co. to build a reputation on "records held", but rather to build propellers that are as accurately and scientifically designed and manufactured as is humanly possible. In other words, to build propellers that combine the utmost in efficiency, performance and service.

. . . Yet, so closely . . . so determinedly has this course been held that performance has been turned to achievement and behind Hamilton Propellers stands a record which is unique in the field.

In the National Reliability Tour, fifteen out of the twenty-four planes that finished were Hamilton equipped . . . the first place . . . and seven out of the first ten were Hamilton propelled planes. In the Class B Trans-Continental Race, New York to Los Angeles, Hamilton Propellers were first, second, third and fourth places. Out of the twenty-one planes in the Class A race, eleven had Hamilton propellers.

So it goes down through the list — the Trans-Continental Sweepstakes . . . the International Races from Windsor, Ontario to Los Angeles, California . . . Aviation Town and Country Club Trophy . . . Detroit News Air Transport Trophy . . . and many more.

There are Hamilton Propellers for every make of plane . . . wood or metal . . . with adjustable pitch. Let us send you complete information.

HAMILTON AERO MFG. COMPANY

MILWAUKEE, WISCONSIN

TRADE HAMILTON MARK PROPELLERS

(Iowa Air News continued)

was to be named after Ralph Cram, editor of the *Davenport Democrat,* former vice president of the National Aeronautical Association, and one of Iowa's pioneer air-minded citizens.

Maneuver and stunt flying by the army aviators, and flying over the city by the ten commercial planes, which were present while the Armistice parade was being held, made up the day's flying features.

LEGISLATION empowering the secretary of state to put air traffic regulations which coincide with the Federal air commerce act into effect in Iowa will be urged at the next session of the legislature by the Iowa state aviation conference, which held its first meeting in Des Moines recently.

In the resolutions adopted by the conference, recommendations that standing committees on aeronautics be appointed for the coming session of the legislature, that pilots be required to have government licenses, and that cities and towns be empowered to establish, maintain and operate airports, were included.

CEDAR RAPIDS will soon spend $20,000 in equipment for its airport, according to announcement of the aviation committee of the chamber of commerce. The money will be used for improving drainage and lighting facilities of the field, and the erection of a building to house offices, waiting room and machine shop.

WITH an estimated attendance of 10,000, the Ottumwa Legion airport celebrated its dedication on Armistice Day.

THE Iowa Air Transport Company has been organized at Boone. A large tract of land north of the city has been leased and plans are now under way for erection of a hangar.

The officers of the new company are: Ben Saunders, president; Robert McBirnie, vice president; H. J. Hagedorn, vice president; Ray M. Guire, treasurer; D. A. Boone, secretary and H. N. Streit, general manager.

WITH the installation of boundary lights at the municipal air field, Des Moines now has one of the most adequately lighted airports in the middle west.

There are 41 white lights bordering the tract; 25 red obstruction lights mounted on telephone poles on north and west sides, together with three set in trees; 32 300-watt lamps on the hangar roof; a floodlight 36 inches in diameter; a 6,000,000 candlepower rotary beacon; and a ceiling light.

CENTERVILLE'S airport is a 160-acre tract located 3½ miles southwest of town. The field is marked by a white circle in the center. Fuel is available at the field, and there are no landing or storage fees.

THE Mason City Airways Company has been sold to Ross Martin of Lincoln, Nebr., who has started a flying school there under the name of the Mason City School of Aviation.

INDIANA AIR NEWS

By H. Gene Haynes

DAILY passenger service to Detroit, Chicago and Louisville has been inaugurated in Indianapolis. The planes are owned by the Capitol Airways Airport of which E. H. Jose is president. The schedule was started October 1.

FRED A. LANTER, Capitol Airways Airport pilot, is the instructor in the 84th division air corps school of instruction which has been opened in the chamber of commerce. More than sixty students are taking the course.

THE airport at Ft. Wayne, formerly known as "Sweetbrock Field", is now to be named the Guy Means Airport, operated by Guy Means Airport, Inc.

LIEUT. R. L. STEVENS, of Atlanta, Ga., is the new flying instructor at the Junior Association of Commerce airport at Marion which was opened recently.

THE Indianapolis Aero Club, composed of numerous young Indianapolis business men, has opened a twenty weeks' aviation school. *(Continued on next page)*

SIMPLEX RED ARROW MONOPLANES



SAFE — DEPENDABLE — SPEEDY

1929 MODELS WILL BE SHOWN AT THE CHICAGO SHOW AND DEMONSTRATIONS WILL BE GIVEN AT THE MUNICIPAL AIRPORT

MANUFACTURED BY

THE SIMPLEX AIRCRAFT CORPORATION, DEFIANCE, OHIO

Say you saw it in AERO DIGEST



At the Hub of the Nation's Airways

FIVE MINUTES by motor car from the Kansas City business district is an airport that spreads out invitingly to the aircraft fraternity over its entire 687 acres — the largest body of airport land so closely adjacent to a metropolitan business section in the country. Immediately across the Missouri River, within ten minutes of the postoffice, is another airport of 200 acres.

At the hub of the nation's airways . . . a factor of vital importance to the manufacturers of aircraft and aircraft accessories who seek the most central location for national distribution.



Radiating from Kansas City are the *airways of the nation.* East, west, north, south, southwest, they make winged transportation of mail, passengers and freight a vital connecting link not only with the entire Kansas City territory but with the nation.

The raw material is here . . . the labor, low power and fuel costs . . . *at the hub of the nation's airways!*

A survey that tells the truth about the opportunities for your industry in this market has been prepared. It will be sent to you confidentially, as well as "The Booklet of Kansas City Facts."



Not just a city but an empire

Kansas City advertising does not confine itself to corporate limits. Within the territory are raw materials and manufacturing advantages of a highly diversified nature . . . many within the city itself, many in the smaller cities of this rich area. Kansas City undertakes to tell the story of the *entire territory* to interested manufacturers, realizing that the city prospers only as its outlying territory prospers.

Opportunity Here Awaits These Products

Men's and Women's Clothing ··· Aircraft and Accessories ··· Hosiery ··· Dairy Machinery ··· Steam Fitting and Heating Apparatus ··· Furniture ··· Porcelain Ware Perfumery and Cosmetics ··· Millinery ··· Wallboard ··· Insulated Wire and Cable ··· Moulding of Bakelite ··· Radio Equipment

Chamber of Commerce of

KANSAS CITY

Kansas City, Mo.

Industrial Committee, Room 7
Chamber of Commerce, Kansas City, Mo.
Please send me, without obligation, "The Book of Kansas City Facts."

Name _____

Address _____

City _____ *State* _____

(Indiana Air News continued)

ATKINSON AVIATION COMPANY, operating a school of aeronautics at Gary, was recently reorganized and incorporated. The company plans to continue improvements of the airport it operates. At present a cinder runway 3,800 feet long and 150 feet wide is being laid and a new hangar constructed. Approximately forty students are now receiving instruction at the school.

The officers of the reorganized company are: V. U. Young, president; Capt. Lloyd H. Atkinson, general manager; Martin Young, airport manager; Lieut. Charles M. Martin, ground instructor; Al DeWitt, chief flying instructor; Mary Irwin, secretary and treasurer; and Francis W. Morrow, superintendent of operations.

THE contract for the erection of a 60 by 60-foot portable hangar at the South Bend airport has been awarded to the George L. Mesker Company of Evansville. The hangar will conveniently house five planes. Obstruction lights, floodlights and boundary lights are now being installed at the field. The *News-Times* is raising a fund which is to be used for marking South Bend for identification from the air. The St. Joseph Valley Aviation Club and the Exchange Club have aided in making South Bend air-minded.

A NEW airport has recently been established at Knox, and citizens of the community have organized the Starke County Aviation Club. The club, which is composed of thirty-one members, offers flying instruction to its members and ground school courses to the public.

Development of three runways and construction of a hangar at the field were carried on under the direction of Lieutenant W. C. Bentley, Air Corps Reserve. Perry McCain is president of the club.

H. H. BROOKS, retiring sales director of the Marmon Motor Car Company, is to head a new company in Indianapolis which will manufacture commercial airplane engines. This new enterprise is being organized by G. M. Williams, president of the Marmon company, and a group of associates.

MARION MUNICIPAL AIRPORT

PROCEEDS from a second air meet held recently went toward buying equipment for night flying for the Junior Association of Commerce municipal airport at Marion, Indiana. The first meet brought in enough money to establish the flying field consisting of 30 acres at that time. Recent additions to the field give it an area of 75 acres.

The new equipment consists of a rotating beacon light with a 75-mile visibility, four floodlights, and boundary lights.

Although the airport is leased by the J. A. C., the passenger service and flying school is under the direction of the Marion Airport Corporation, composed of local business men. Four planes are maintained.

Finances for the leasing of the field and for improvements were taken in by the J. A. C. through staging an entertainment.

INDIANAPOLIS NEWS

By Frances Hanna

LOUIS CHEVROLET has announced that development has started on a new airplane engine, designed by him for commercial aircraft, and being built under his supervision at the plant of the Merz Engineering Company, this city. The new engine is a vertical, four-cylinder in line, air cooled type, developing 80 h.p., and weighing less than 300 pounds. The first engine is expected to be completed before March 1st. If it proves successful in test, the engine will be manufactured in Indianapolis.

Mr. Chevrolet's company, to be known as the Chevrolet Aircraft Corporation, was incorporated in May, 1928. His son, Charles, is associated with him.

AN aviation engine of the barrel type has just been completed at the plant of the Merz Engineering Company from the design of Lee Oldfield of Chicago. This sample engine is of light weight, will produce 50 h.p. at 2,000 r.p.m, is eight-cylinder two-stroke cycle, supercharged; and a large part of the design is based on the work of Dr. Junkers of Germany.

THE Southern Indiana Fliers, Inc., has been organized as a result of a movement for an airport at Seymour, Indiana which has had the support of the Rotary and Lions clubs, and the Seymour Business Men Association. The company has bought a new type, center section Eaglerock, and is build

(Continued on next page)

SUMMERILL SEAMLESS TUBING

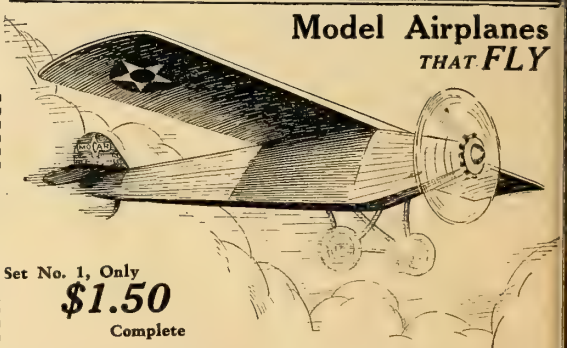
More Summerill Tubing can now be obtained.

Addition to Aircraft Tubing Equipment now in operation.

SUMMERILL TUBING COMPANY
Bridgeport, Montgomery Co., Pa. (Phila. District)

The MOCAR

Model Airplanes THAT FLY

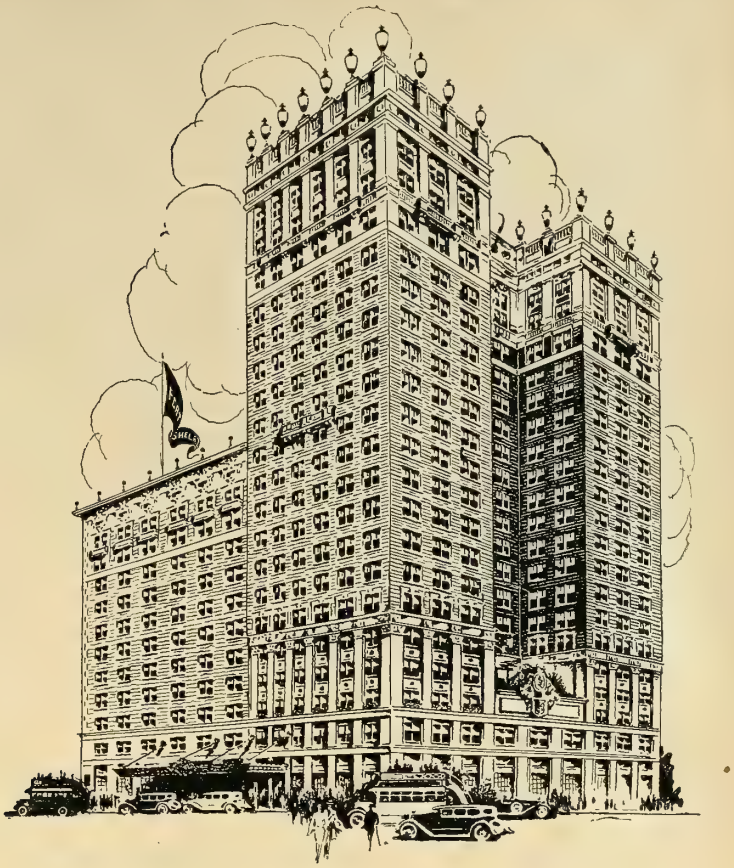


Set No. 1, Only
$1.50
Complete

BOYS—at last, here is a genuine aluminum model airplane that really flies. And at a small price.
The "Mocar" monoplane—Set No. 1—is a copy of the famous Spirit of St. Louis. Wing spread 18 inches, fuselage 12 inches, powerful motor, special propeller, rubber tired disc wheels. Weight complete only about 2½ oz.
This is a real model plane that gives you a whole lot of fun for the moderate cost. The all metal construction makes a sturdy plane that will stand a lot of abuse. The outfit is mounted on cardboard with all parts plainly marked and full instruction for assembly. Complete, only $1.50 postpaid, (3 for $4.00).
Great fun, learn how to make and fly airplanes. Order now.
Jobbers, dealers and schools write for discounts.



The Mount Carmel Mfg. Co.
Dept. K
New Haven Conn.



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Maynard D. Smith
President

HOTEL FORT SHELBY

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Lafayette and First
DETROIT

Here, with all downtown Detroit—theatres, shops, wholesale and financial districts—practically at the doors, is every feature of accommodation, including Servidors, 900 reposeful guest rooms, 4 restaurants, and the highest degree of comfort, convenience, and quietude.

Whether your choice be one of the many excellent rooms at $2.50, $3, or $4, or one of the higher-priced, especially large rooms or fireplace suites overlooking the city, or the river and Canadian shore, you will enjoy a particular sense of value in the Fort Shelby. Guests arriving by motor are relieved of the care of their cars by competent attendants.

Tickets to theatres, concerts, operas, sporting events, etc., reserved in advance upon request at the Fort Shelby.

(Indianapolis Air News continued)

ing a two-place hangar on the field. Floyd Stork, of Evansville, will be the pilot. Incorporators of the company are: J. F. Kieffer, John I. Blish, O. L. Doud, E. M. Bass, B. F. Swain, Jr., Lynn Faulkconer, Jr., and Alva Hancock.

THE Indiana National Guard is marking the roof of every armory in Indiana, which includes more than thirty towns. Directional arrows and city names in yellow, twenty-foot letters, visible from a height of 2,000 feet, are being painted. Roofs marked thus far are in Greensburg, Franklin, Indianapolis, Columbus, Logansport, Muncie, Tipton, Delphi, Rensselaer, Lebanon, Elwood and Martinsville.

Also, the National Guard units plan to have business organizations in the various cities sponsor the painting of from five to fifteen factory and building roofs in a similar manner. By request, the adjutant general's office will have the roofs of privately owned buildings painted according to Department of Commerce specifications, at a special rate of $2 a letter.

In Indianapolis, the Chamber of Commerce is urging air-marking. On the Stutz Motor Company factory roof are the words "Stutz —Indianapolis", with an arrow toward a local airport and the distance indicated; other marked buildings are the Ford Motor Company, Bemis Bag Company, and the Hoosier Garage; and, of course, the two local airports, Capitol Airways and Hoosier, and the Armory.

WICHITA AIR NEWS

By Edwin W. Pryor

THE Knoll Aircraft Company has taken over the factory of the Laird Aircraft company, and is busily engaged in manufacturing its first plane, which is due to be ready for tests about the middle of December. It will be a four-place cabin biplane, designed by Felix A. W. Knoll.

A group of Wichita men are backing the new firm, which took over the defunct Laird firm. Before suspending operations the Laird company built four ships, four-place cabin jobs known as "Whippoorwills", luxuriously equipped.

BETWEEN 2,000 and 3,000 persons attended the air races at Pratt on October 27, held under the auspices of the N. A. A. chapter there. Many Wichita pilots participated.

TRAVEL AIR, INC., has added another type to its regular production. It is a three-place biplane powered with a Challenger motor. It will make 125 miles an hour.

The addition of the Challenger job gives Travel Air six "line" types: the Wright three-place biplane, the six-place monoplane, the OX-5 three-place job, the Warner Scarab biplane, the "Speed-Bug", and the new one.

The company has produced a new speed job which will become a standard production job soon. It is a two-place biplane, powered with an OX-5 motor and capable of 120 miles an hour. The fuselage is 5 inches narrower than the standard OX-5 job turned out by the firm, and the wings are "clipped".

CONSTRUCTION has started on the first of three buildings planned by the Southwest Airways, Inc., at the new field northwest of the municipal airport. It will be a club room, 20 by 60 feet. The other two buildings, one a big hangar and the other a repair shop, will be erected within 30 days, according to H. F. Mitchell, general manager.

The company, which operates a flying school in Los Angeles, will open a similar school here, and plans the inauguration of an air mail and passenger line between Wichita and Los Angeles.

Besides H. F. Mitchell, incorporators are: J. A. Mitchell, T. R. Mitchell, L. M. Jenkins and Cliff Matson. The Mitchells are nephews of Colonel "Billy" Mitchell, former army air chief.

AN airplane race from Wichita to Hutchinson featured the air meet held November 11 at the latter city, under the auspices of the N. A. A. chapter there.

SWIFT AIRCRAFT CORPORATION has tested a Warner motor in one of its two-place biplane training and sport ships and plans to use it almost exclusively hereafter. The Swift company has moved into the factory building erected on the new municipal airport by the Quick Air Motors Company, now dissolved.

Last chance BARGAINS in Liberty 12 cylinder motors and parts from Rosenfield Aircraft Co., P. O. Box 65, Mt. Rainier, Maryland. (Mail address.)

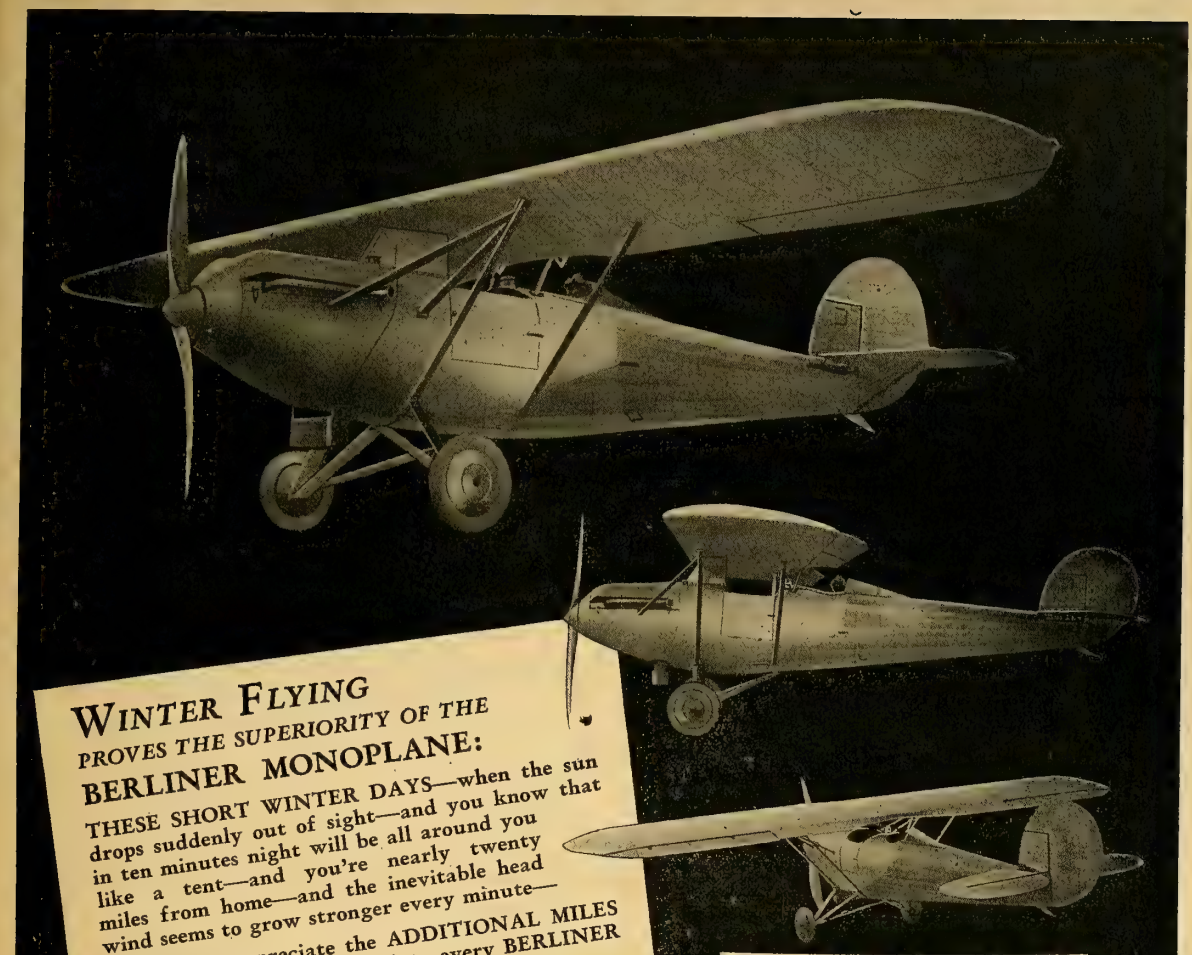
New Liberty 12 cylinder motor, complete with prop. hub, ex manifolds and hand starter	$500
Used Liberty 12 cylinder motor, complete, as above stated, has been overhauled and ready for use	400
Enough new Liberty 12 cylinder motor parts to build a complete motor, as above stated	400
Enough used Liberty 12 cylinder parts to build a complete motor, as above stated	250
Camshaft housing with cams, rocker arms, camshaft, new, $65; used	37.50
Oil pumps, new $20; used	10
Water pumps complete, new, $20; used	10
Cylinders new but oversize, $15 each; new perfect, $50; used	7.50
Valves, new tulip, $3 each; used flat heads types	1.00
Connecting rods, in sets of twelve, for one motor, per set	40
Connecting rods, bearings, in sets of twelve halves, new, per set	10
Propeller hubs, complete with flanges and bolts, new, $20; used	10
Crankcase assembly, includes crankshaft, bearings and spindles, new	125
Carburetor new $20; used	10
Distributor with Bakelite head, complete, new, $25; used	12.50
Stub tooth gears in complete sets only	50
Exhaust manifolds, in pairs for one motor	5
Pistons, high or low compression, new, $5; used	2.50
Hand starters, new, $10; used	5

Other Liberty 12 cylinder material at proportionate prices. Any person sending in order for five sets (SETS mean all of particular articles for one motor) can deduct fifteen per cent from above price on parts only.

We carry a large stock of parts for the Curtiss D-12; Packard; Hispano Suiza 300 H.P. motor; Wright Hispano 180 H.P. and Hisso 150 H.P.; almost any type magneto or electric and hand starters; generators; instruments; search light 36 inch, powerplant for same; observation balloon outfits, 88 feet long and 30 feet diameter, capable carrying five passengers and pilot up five thousand feet; radiators for any type airplane or motor. All the above stock not sold by January 15th will be sold as a lump to the highest offer in order to make way for our new manufacturing project. If you can use anything send in your order. We will guarantee entire satisfaction in goods and price or refund your money, less transportation charges. No questions asked or lit's or and's. If goods are returned before leaving transporting carrier's possession, we will refund your deposit.

Any person sending in orders for material send to mail address. If inspection is desired come to College Park, Maryland Flying Field, between 8 A. M. and 5 P. M.





WINTER FLYING
PROVES THE SUPERIORITY OF THE
BERLINER MONOPLANE:

THESE SHORT WINTER DAYS—when the sun drops suddenly out of sight—and you know that in ten minutes night will be all around you like a tent—and you're nearly twenty miles from home—and the inevitable head wind seems to grow stronger every minute—

THEN you appreciate the ADDITIONAL MILES PER HOUR that are built into every BERLINER MONOPLANE.

AGAIN, AT THE AIRPORT—when the raw winds are gusty and uncertain—tricky air pockets are everywhere—and you watch obsolescent little biplanes take off with many a dip and wobble and waver—while your BERLINER MONOPLANE flies itself off the ground with the steadiness of a ship many times its size—and lands with an equal smoothness—THEN you are glad to have the up-to-date, inherent STABILITY of the BERLINER MONOPLANE.

The Berliner Monoplane
with OX-5 Engine
$3290
Flyaway, Completely Equipped
Washington, D. C.

Also available with Wright Whirlwind and Warner Scarab Engines.

Write for Information

BERLINER AIRCRAFT COMPANY
Incorporated
ALEXANDRIA, VIRGINIA

Berliner Monoplane features are plentiful, including exceptional visibility, easy access to passenger compartment, ease of rigging, inspection and maintenance, interchangeable parts, readily removable radiator and gas tank, improved stabilizer control, and highly efficient hydraulic-spring shock absorber.

SPECIFICATIONS

Length overall, 25 feet 10 inches; height overall 8 feet; airfoil Goettingen 398; span 36 feet; area of wings and ailerons 219 sq. feet; weight empty, 1400 lbs.; gross weight loaded, 2300 lbs.; high speed (full load, sea level), 105 m.p.h.; landing speed, 41 m.p.h.; absolute ceiling, 16,000 feet.

(Wichita Air News continued)

WALTER T. VARNEY, president of the Varney Air Lines, has ordered six Stearman jobs powered with Cyclone motors, to add to his fleet of six Whirlwind Stearmans. The first of the order will be ready early in December.

MRS. VICTOR ROOS, wife of the general manager of Swallow Airplane Company, has been elected president of the Wichita chapter of the Women's Aeronautical Association, succeeding Mrs. Roscoe Vaughan, resigned.

C. A. BRAUKMAN, of the Aeronautics Bureau, Department of Commerce, has again been assigned to Wichita as plane and pilot inspector.

A RADIO broadcasting station has been installed at the municipal airport by the Government to aid fliers to obtain up-to-date weather reports and other valuable information. Primarily, it is for the use of N. A. T. pilots, but all fliers will be given the service on request.

SWALLOW AIRPLANE COMPANY has produced a new type training ship. It is a two-place job, very similar to the well known OX-5 three-place biplane, but 200 pounds lighter.

It has a landing speed of less than 25 miles an hour in dead air and can safely use almost any of the many nearly obsolete types of motors abounding in most air schools, according to Victor Roos, general manager of the company. The new plane will be called the "Swallow TP".

"This ship gives the student seeking 200 hours for his transport license an inexpensive ship, and one that is easy to fly," Mr. Roos said. "It provides a plane for the hundreds of old motors in this country now rusting in schools because there is no ship in which it is safe to install them."

Three of the new planes will be exhibited at the Chicago international exhibition, and the factory is preparing to produce a large number of them in the immediate future.

CESSNA AIRCRAFT COMPANY, builder of the Cessna monoplane which won the Class A transcontinental air derby, is building a six-place monoplane in answer to the demand for a larger ship.

The new model incorporates all the Cessna principles of plane building, including the cantilever wing, but is built around the new 300 horsepower Wright motor. The Wasp motor also will be used in it. Temporarily, Whirlwinds will be used.

The first ten of the new type produced have been bought by a subsidiary of the Cessna company formed by R. V. McIntosh, new sales manager. He plans to install taxi and transport services in certain California cities, chartering the planes to groups of tourists.

AN airline from Wichita to Tulsa, employing a Travel Air monoplane, was started November 15. N. L. Sifers is general manager of the new transportation company; other officers are I. M. McConaughey, Jack Cramel, and Howard Swartz. Two round trips are made daily, one in the morning and one in the afternoon. Oil men of the two cities are patronizing the line extensively.

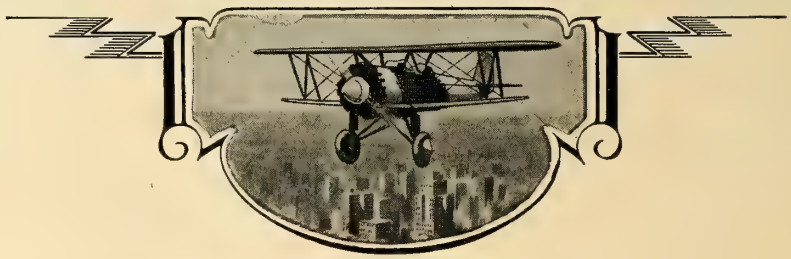
THE Supreme Propeller Company of Wichita, Kansas, has recently appointed the following sales distributors:

Wichita Falls Air Transport Co., Wichita Falls, Texas; San Antonio Aviation & Motor Co., San Antonio, Texas; Travel Air Ways, Dallas, Texas; McIntyre Airport, Tulsa, Okla.; Oklahoma Air Transport, Oklahoma City, Okla.; and Robertson Aircraft, St. Louis, Mo.

HAVING recently been refinanced, Braley School of Flying is planning a program of expansion. A large new hangar is to be erected soon. A dormitory and a restaurant will also be constructed as a part of the building program. A system for the complete servicing of all types of planes will be established.

There are now about 118 students enrolled, exclusive of technical students. The school has a staff of nine instructors.

Ted Braley is president of the school; J. E. Akers, business manager; T. E. Braley, is chief of the ground school; O. P. Harrah, operation manager; John Flournoy, chief flying instructor; Forest Leathers, field manager; F. W. Harmon, chief mechanic; and Ward Braley, chief designing engineer.



SPEED

The telephone rings. "Hello Joe! I got tickets for the game. Yes, I know it's late but you're only an hour and a half away in your Stearman. I'll meet you at the airport. So long."

After the game. "Jim, that was the best game I ever saw. Fast, too. Almost as fast as my Stearman. No trouble to cruise a hundred and ten in it at sixteen fifty. Real performance, Jim. My, that was a wonderful game."

The STEARMAN AIRCRAFT Co.
WICHITA, KANSAS

Say you saw it in AERO DIGEST



QUEEN CITY AIRLINES, INC.
Aerial Tours
628 Provident Bank Building
CINCINNATI October 8, 1928

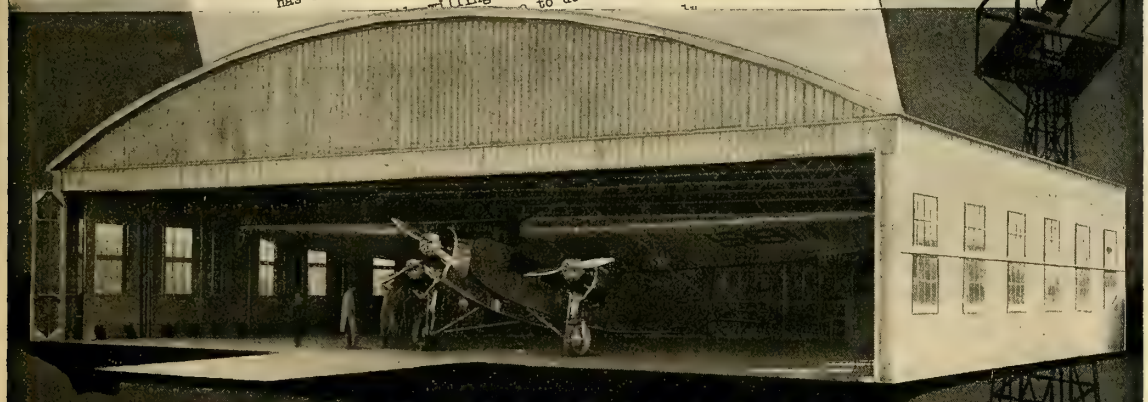
International Derrick & Equipment Co.,
Columbus, Ohio.

Gentlemen:

In reply to your letter of October 3rd, would state that we are all very much pleased with the hangar and we have heard nothing but favorable comments from everybody that has seen it.

willing to allow you to use our name in to do in regard to this hangar.

See our Display at International Aeronautical Exposition, Chicago



"We are very much pleased with the hangar ——"

Spacious—Rust Resistant—Fire Safe—Weathertight—Good Looking—Free Operating, Timken equipped doors—Easy to erect and Economical.

These are the primary reasons why Individuals, Airports and Aircraft companies are turning to IDECO for Hangars, Beacon Towers and Auxiliary Buildings.

Literature on request.

INTERNATIONAL STANDARD IDECO BUILDINGS (GALVANIZED)

THE INTERNATIONAL DERRICK & EQUIPMENT CO.
Columbus, Ohio Los Angeles, Calif.

Detroit Dallas Houston Shreveport Tulsa Torrance Los Angeles

Export Representation: 74 Trinity Place, New York City
Columbus, Ohio Houston, Texas
Los Angeles, Cal.

ST. LOUIS AIR NEWS

By A. W. League

THE St. Louis Air Board has passed an order prohibiting "hedge hopping" over the city. The prescribed altitude is 3,000 feet over the downtown district and 2,000 feet in the residential district. Field Manager O. E. Scott has been instructed to enforce this order.

THE RS1, stationed at Scott Field, near St. Louis, successfully battled her way through a series of severe line squalls recently. The RS1, which measures 282 feet in length and carries a crew of fourteen officers and men, was on the last lap of its return trip from San Antonio, Texas, when it ran into a succession of storms below the mouth of the Ohio River. The storms at times bent the ship in the shape of a horse shoe and blew her many miles off her course. So severe was the storm that it ripped the covering away at the nose, and bent and battered the metal braces and struts which form the nose of the ship. Under the skilful guidance of Capt. William E. Kepner, winner of the Gordon Bennett balloon race, the battered and torn RS1 weathered the storm and made a belated landing at Scott Field.

ANOTHER thrilling incident took place recently in which the personnel at Scott Field took an active part. Lieut. Ralph Holmes permitted himself to float out over Horse Shoe Lake in a free balloon, which he landed in the water. He was rescued from the lake by one of the Scott Field blimps, as movie camera men made a film record of the rescue.

THE Curtiss-Robertson Airplane Mfg. Co. has contracted to sell for a period of five years, its entire annual output of 1,000 Curtiss-Robins to the Curtiss Flying Service, Inc. Production at the Robin factory is gradually being stepped up to the three-a-day schedule necessary if the company is to fulfill this contract.

A Robin powered with the new Curtiss Challenger motor and one powered with an OX motor are being built for the Aeronautical Show in Chicago.

PLANS for the first transcontinental air passenger line operating between Los Angeles and New York by way of St. Louis have been announced by the Universal Aviation Corporation, of which the Robertson Aircraft Company is a subsidiary. Ten new trimotored Fokkers have been ordered for service between St. Louis and New York through Columbus, Ohio. Meanwhile, the Western Air Express will receive delivery on its new fleet of trimotored Fokkers and start its air service from Los Angeles to Kansas City shortly after December 31st. The planes will have sleeping quarters for those who wish to continue their trip at night, with the option to passengers of transferring at various junctions to make night journeys by rail. Passenger service was inaugurated between St. Louis and Kansas City on November 15th and the schedule for the St. Louis-Chicago service has been revised to enable passengers from Kansas City to change planes at St. Louis and continue on to Chicago with a delay of about an hour for lunch.

Passengers leaving Kansas City at 8:30 a. m. will reach Chicago at 3:30 p. m., while those leaving Chicago at 9 a. m. will reach Kansas City at 5 p. m. Both planes are due to arrive in St. Louis about noon, the Chicago bound plane departing at 12:30 p. m. and the one going to Kansas City, about 2:30 p. m. Single motored Ryan monoplanes are being used on the St. Louis-Kansas City route at the beginning, with the trimotored Fords continuing in the service between here and Chicago. The fare to St. Louis from both Chicago and Kansas City will be $30 one way and $55 a round trip. This service will operate seven days a week, instead of six days as previously operated. Charlie Rousch and Walter Hunter have been assigned to the Kansas City-St. Louis passenger route. E. L. Sloniger and Bert Isom have been selected for the St. Louis-Chicago route, with Stancil Gilley and Bennie Howard as co-pilots.

One of the three trimotored Fords of the Robertson Aircraft Corporation has been turned over to the Northern Airways, Inc. The planes on the St. Louis-Chicago run will connect at Chicago with the planes of the Northern Airways, which will furnish passenger service from Chicago to Minneapolis and St. Paul, with several stops en route. The route between St. Louis and

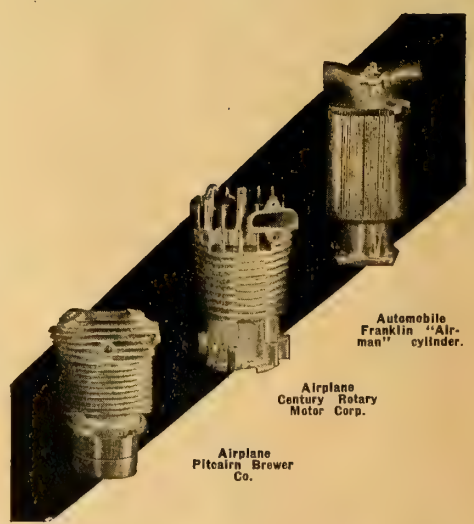
(*Continued on next page*)

Air Cooled Design Leads

The modern trend in today's airplane engine is the air cooled principle.

Successful flights made with planes having air cooled engines have gone on record — and those records are conclusive.

We specialize in the manufacture of cylinders for air cooled motors, using to the greatest advantage the combined strength of nickel, steel, and iron.



AIR COOLED CYLINDERS

S. Cheney and Son

MANLIUS, N.Y.

We are ready to co-operate with any concern requiring a special or standard type of air cooled cylinders.

Say you saw it in AERO DIGEST

You Get Valuable Training In *All* Branches of Aeronautics

at the College of the Air!



All helpful subjects—from the finest flying courses to a complete background in executive training, from designing and construction to the theoretical work in navigation, meteorology and allied instruction—are offered at The College of the Air to give you thorough work—work you actually must have to forge ahead in aviation!

The men who today are getting the big positions with the new rapidly growing aircraft companies are men who are trained in every aeronautical subject—and you, too, must get complete training!

Take your training in a school that gives you more than a short flying course and work on just one or two motors. The College of the Air will give you a foundation of worthwhile knowledge in every branch of aviation! Come to Marshall for training that will win you success!

At Marshall Flying School you learn to fly at the finest flying school and also you are trained to meet the other unlimited opportunities in aviation.

This Great New Industry Needs Trained Executives, Too!

There is a wealth of opportunities for the business man of aviation! Only a few men now can qualify and hundreds upon hundreds will be needed.

Executive positions must be filled by men who have a well founded aeronautical education in business training, field managing, transportation



directing and other executive duties, in addition to flying and mechanic work.

You can get this training at the College of the Air—the aeronautical college that offers all training, the college that gives you complete business training in addition to the finest piloting and mechanic courses of any civilian flying school in America.

Engineer's and Mechanic's Ground Course **$75.00**
Special training in aeronautical business methods, in designing, avigation, metal airplane construction and complete motor and aircraft work, including both repair and construction, instrument instruction and all theoretical and practical work in aircraft and aircraft motors.

Complete Aviation Course **$240.00**
All the principles of flying, forced landings, cross country and all weather flying with guaranteed solo work. Engineer's and Mechanic's Ground Course included.

Special 50 Hour Course **$600.00**
Complete training in full 50 hours of instruction including necessary dual instruction and completion with solo work. Engineer's, Mechanic's and Executive's Ground Course.

Limited Commercial Course **$700.00**

This course gives you all the training to make you eligible for examination by the Department of Commerce examination for your Limited Commercial Pilot License.



MARSHALL FLYING SCHOOL, INC.

150 N. English St., Marshall, Missouri

Gentlemen: Please send me your FREE book, "Get Up Into the Sky."

Name .....

Address .....

Mail this coupon and receive our book "Get Up Into the Sky." Shows you how to get your start in Aviation.



(St. Louis Air News continued)

Kansas City will be operated only on a daylight schedule until the route has been lighted for night flying. Bids for the lighting of this route have been announced by the Department of Commerce. The bids will include the installation of 20 revolving beacons and lights at seven emergency landing fields along the route.

BESIDES operating passenger and air mail lines, the Robertson Aircraft Corporation is preparing to sell aviation supplies on a large scale. The company plans to start with a $100,000 stock, which will be increased until it is complete. An excellent field for the sale of aviation supplies is developing daily, and with air express and mail service becoming general, parts can be shipped to any part of the country. E. L. Smith and H. C. Wilcox will have charge of the sale of spare parts, as well as of the sale of reconditioned planes.

Construction work has been started on the new $65,000 hangar and flying school building belonging to the Robertson company. The company is equipping its hangars with a blower heating system, which blows heat down to the floor. Fuel oil is used and is stored in a 10,000-gallon storage tank.

THE plant of the B. F. Mahoney Aircraft Company located at Lambert Field is now in operation. The San Diego plant of the concern is to be closed, and the Ryan monoplane will be made exclusively at the St. Louis plant. The factory is being operated under the supervision of John C. Nulsen and Frank Tindale. L. W. Butts, assembly department head of the California plant, will take charge of the assembly department at the local plant.

The new Mahoney plant has been designed to save steps. Wood from the stock room is carried less than 10 feet to the cutting machines. The woodworking is done on one side of the plant, while steel tubing is welded into fuselages on the other. The new model Ryan cabin job which is being built at the new plant is quite an improvement over the old model. The new plane, although resembling the well known Ryan type in its general appearance, will have places for four passengers and two pilots and also a luggage compartment. The first of the new ships will be tested this month and will be displayed at the Chicago Aeronautical Show.

RAY JOHNSON has recently been added to the Von Hoffmann Aircraft Company as an instructor.

The company has purchased a gas and oil service truck with a gas capacity of 350 gallons. This is the second truck of this kind to make its appearance at Lambert Field—the other one being owned by the Robertson Aircraft Company.

THROUGH the coöperation of Joseph W. Wecker, field manager at Parks Airport, and W. C. Best, district manager for the Southwestern Bell Telephone Company, a telephone directory of airports is being compiled. This will eliminate many inconveniences. When completed, the directory will be issued to commercial pilots to be carried in their planes for reference in the event they need assistance following emergency landing in strange territory. The book will contain the phone numbers of every airport in the United States, as well as the code addresses of all radio call stations.

RECORDS for enrollment in commercial flying schools were broken by the Parks Air College when the roster showed 333 students. The enrollment has maintained an average of five students a day since the school began operations five months ago. Night classes for mechanics who are employed during the day were started October first. Four new OX-5 Travel Airs have been ordered to take care of the constantly increasing enrollment. The school now has 18 instruction ships.

In less than six months Parks Air College has achieved the distinction of being the largest commercial flying school in the United States. Parks has given St. Louis not only its best flying school but also has equipped St. Louis with its first night landing field.

THE first issue of the Robertson Air News, published by the Robertson Aircraft Corp. for distribution at Lambert Field, has made its appearance. The booklet contains all the latest St. Louis Air News as well as the latest field "scandals." It is edited by Bill Dings of the Robertson staff.

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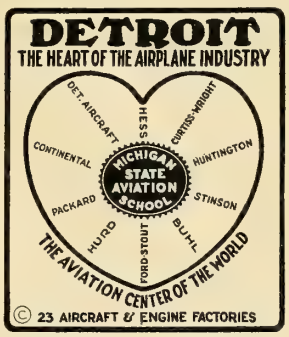
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KANSAS CITY AIR NEWS

By H. H. James

THE $1,000,000 bond issue voted for the purchase and improvement of the Kansas City municipal airport was voided by a decision of the Missouri supreme court. The same decision was rendered in the case of the $2,000,000 issue voted by the citizens of St. Louis, the issues being identical. The suit was taken to the supreme court by the two cities to determine the legality of the bonds. The nullification of the two issues was made on a technical point, the court holding the cities had erred in not providing a special registration of voters for the bond election. The court, however, has granted a rehearing of the case, and new arguments and briefs will be filed.

ARMISTICE DAY was a big day at the Kansas City Airport, where an air carnival was staged by the Air Corps Reserve Officers' Association. More than 10,000 persons witnessed the events which included races for different types of planes. Dale Jackson, a young St. Louis pilot just out of a flying school, took most of the honors.

Blaine M. Tuxhorn demonstrated his invention designed to pick up mail and express while the plane is in motion.

A NEW type airplane motor is being developed in a machine shop here for two young men of Miles City, Mont. The inventors are C. E. Franklin and J. T. Sugars. The motor will be ready for demonstrations soon.

The "barrel" type motor has 16 cylinders and is air-cooled. It is said to develop 400 horsepower and weighs only 359 pounds. It can be used either in airplanes, automobiles, or tractors.

DAILY airplane passenger service was inaugurated between Kansas City and St. Louis November 15 by the Robertson Aircraft Corporation, a unit of the Universal Air Lines. The planes from here make connections in St. Louis with planes operated by the company to eastern cities. Five-passenger Ryan Brougham monoplanes are being used on the route.

H. J. McNally, general traffic manager of the Robertson corporation, said the Western Air Express using trimotored Fokker F-10s would begin operations on March 1, 1929, with Kansas City as a key city.

EARL H. SMITH has been appointed director of sales promotion of the American Eagle Aircraft Corporation here. Mr. Smith was a lieutenant in the aviation corps during the world war and is a member of the air crops reserve.

PASSENGERS on the Interstate Air Transit line between Kansas City, St. Joseph and Omaha, are provided with free transportation to and from the airports here and in Omaha. The service was established September 11, with a fare of $5 to St. Joseph and $17.50 to Omaha.

THE American Eagle Aircraft Corporation has opened an airplane show and sales room located in the very heart of Motor Row. It is being operated in connection with the offices of the Porterfield Flying School, a subsidiary of the American Eagle corporation. A complete line of American Eagles is displayed.

BENNETT FLYING SCHOOL is now operating flying fields at Okmulgee, Okla.; Pittsburg, Kans.; and Coffeyville, Kans. During the winter, if weather conditions are unfavorable at any one of these places, students may be transferred quickly by plane to one of the others without interrupting their training.

Roland Guthrie is managing the Pittsburg Field, and John Armstrong, the Coffeyville field.

At the Kansas City school, a night course was recently established.

DETROIT AIR NEWS

By Frank Bogart

APPROVAL at the November 6 election of a $5,000,000 bond issue for enlarging and improving Detroit's 300-acre municipal airport, which is only 20 minutes from downtown, has stimulated every branch of aviation activity in the city. Part of this sum is destined to be used to construct one of the finest air administration buildings in the world, which will also house the All-American Aircraft Show after the coming year.

An old appropriation of $80,000 is already in use for the first hangar on the port, to accommodate 16 planes, work on which began the day after election. It will be finished early in the new year, and the 107th observation squadron of the Michigan National Guard will then transfer there and take over half a dozen new planes which have been allotted to it.

This airport is in no way to be confused with the mile square site recently purchased by Wayne County about 16 miles west of the City Hall, and for which no development plans have yet been announced, though more than $1,000,000 in bonds is already available for such work.

Enough land is to be condemned and added to the city airport to provide a minimum run of 4,400 feet in all directions, and one 7,400-foot runway will be laid out. It is said this will be the longest on any commercial airport in the world. A large portion of the port, which is located at Lynch and French roads, is already completed and plans are under way to light it.

Next spring an aeronautical commission of four members will be created to manage both the city and county ports. The latter is expected to be made available principally for manufacturers wishing to locate here.

AT this writing, the Stinson Aircraft Corporation has not definitely decided on the site of its new plant, but a choice will be made in December and it is expected the plant, providing a capacity of three to five planes a day, will be in operation next April. The company is nearly ready to announce a trimotored ship, it is rumored, as well as its single engined junior and senior sedans.

BAD weather has been a considerable hindrance to the operation of passenger service between Detroit and Chicago by Stout Air Services, Inc., using Ford trimotors. The service began November 1, first anniversary of the Stout line to Cleveland, which carried 6,500 paid passengers in its first 12 months. Only one trip a day each way is made to Chicago at present, the single fare being $30 and the round trip $50. The planes leave both cities at 2 p. m.

THE rapid increase in the number of flying students enrolling in Detroit and Michigan is nothing short of phenomenal. In the first week of November there were 96, including half a dozen girls. There are now over 400 students under instruction in the state and 196 licensed pilots, placing Michigan fourth in the nation's total of 3,690 pilots. Only California, New York and Illinois exceed this state.

THE Associated Commercial Airmen of Michigan has been incorporated as a non-profit group, its aim being to embrace every pilot and commercial owner in the state in an organization that will seek to enforce all state and federal flying rules as well as to promote the use of air transport by the public at large.

Guy Burns, Ivan Kay and Alice Gorham are president, vice president and secretary-treasurer, respectively. The 16 charter members represent a total of 27 planes owned and 200 students under instruction in their schools. Five air taxi operators are also charter members.

MICHIGAN AIR NEWS

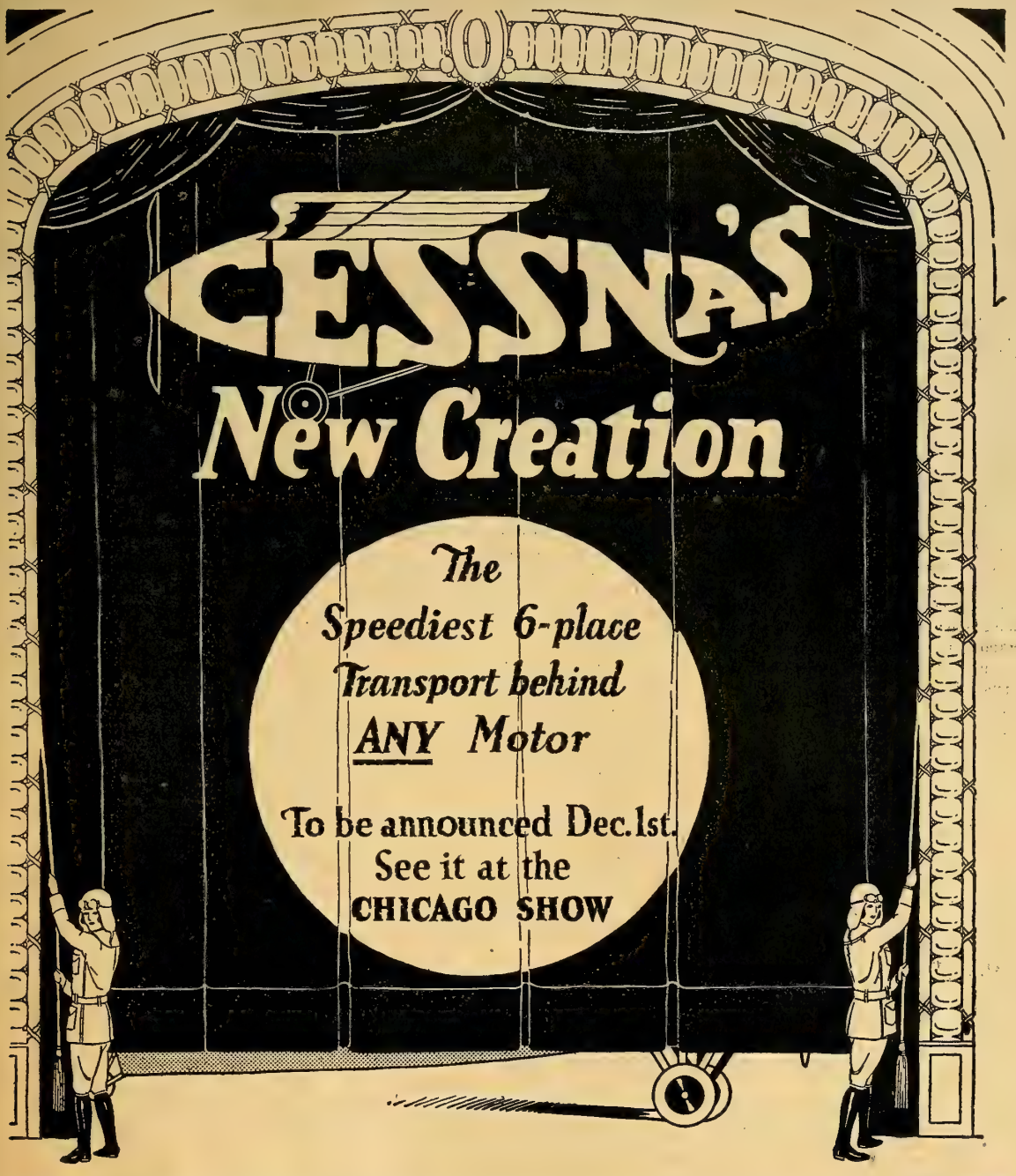
THE Hayes Body Corporation, Grand Rapids, recently purchased a Stinson-Detroiter Junior for the use of the directors and officials of the company. The plane has been and is valuable to the company both as an advertising feature and as means for saving much time on business trips. John H. Price is the company's pilot.

THE Jenkins Company of Chicago, Illinois, was awarded the contract for installing the route lights and intermediate field beacon on C.A.M. 27 between Kalamazoo and South Bend.

THE beacon at the Kalamazoo airport has been installed and is in use. Work is progressing rapidly on the boundary markers and obstruction lights, which will be ready in a short time.

JACKSON airport is being improved by leveling off of the two mounds in the field and by extending the north-south runway 300 feet to the north. The runways will be marked by orange colored flags.

PONTIAC and Flint inaugurated air mail service, operated by the Thompson Aeronautical Corp., on November 27.



The Cessna Aircraft Co.
Wichita, Kansas

DALLAS AIR NEWS

By Capt. W. H. Scott

A DRIVE to foster aviation in Texas was announced here by Rufus Scott, of Paris, Texas, newly elected department commander of the American Legion, at a meeting of Radio Post of that organization. He will stress the building of an airport in every town and village in Texas.

THE Aviation Cadets of America featured an airplane display that attracted hundreds of thousands of persons to their exhibit at the State Fair of Texas. The cadet display was lent by the Southern Airways of Dallas and San Antonio.

Southern Airways of Dallas, and their subsidiary, the Dallas School of Aviation, showed an airplane at the Fair.

THE first air taxi company in Texas commenced operations in Dallas in October when Garza Wooten, secretary of the Dallas Flying Club, opened for business with a new Ryan Brougham. Wooten plans to establish a regular passenger line.

FOLLOWING the experiment last summer of training organized reserve of the Air Corps at Love Field, headquarters of the 366 Observation squadron, a year-round training school and camp will be put into operation at the squadron headquarters the early part of December when additional equipment has been received and enlisted personnel added to the staff.

"MODERN AND FUTURISTIC ORDER OF PECKERWOODS" is the name adopted for a club composed of air officers which was recently founded in Dallas. Leaders in the movement are Major Joseph H. Noyes, commander of the 366th reserve air squadron; Lieut. Harry Weddington, Army Air Corps; Col. W. N. Hensley, commander of Brooks Field, San Antonio; Captain W. F. Long. Titles for officers of the club are derived from the various members of the woodpecker family, and each titleholder bears some of the eccentricities of the type for which he is named. The "nest" of the Peckerwoods is at Love Field, Dallas.

TEXAS AIR NEWS

By James Lovell

THE first good-will trip by air in the Southwest was sponsored by the Fort Worth Association of Commerce. A score of planes were in the areocade which made a tour of West Texas cities during the past month.

THE Texas Air Transport, Inc., operator of air mail planes from Dallas to Galveston and from San Antonio to the Mexican border, has been purchased by A. P. Barrett, Fort Worth.

The new owner announced a program of expansion which will include inauguration of passenger service over the existing lines and over a route from Dallas to El Paso.

SERVICE over the Dallas-Wichita Falls airline will begin November 20. Fulcher Armstrong, of Wichita Falls, is president of the operating company.

GREENVILLE has leased for a year, with option to purchase, 183 acres for a municipal airport. The field, which is located 4.4 miles from the business center on State Highway 1, National Highway 67, is under the administration of Mayor Joseph F. Nichols, formerly Executive Officer of Love Field, Dallas, during the World War.

OKLAHOMA AIR NEWS

By Ernest W. Fair

CHARLES GRAY, president of the Standard Roofing and Material Company, has become a stockholder in the Southwest Airways Corporation and will act in an advisory capacity. Bob Tarbutton is now sales manager, and Roy French, chief pilot and flying instructor.

LEE BRADWAY, contractor, has become president of the Air Service Corporation. J. R. Green, attorney, is in charge of the downtown office and is also field representative. Edwin Ross is instructor.

CLINT JOHNSON, of the Aero Photo Company, is office manager and ground instructor of the Oklahoma Air Transport Co. Bennett H. Griffin is in charge of the Oklahoma City branch and also in charge of flying instruction.

(*Continued on next page*)

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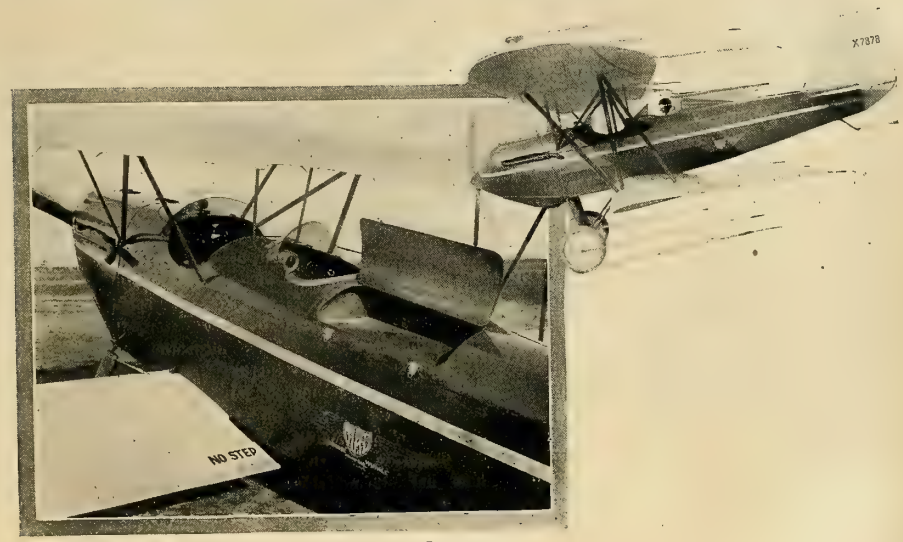
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Take off run	100 ft.
Climb at sea level	1,000 f.p.m.
Absolute ceiling	20,000 ft.
Gasoline consumption at 100 m.p.h.,	5 gal. p.h.
Endurance at cruising speed	9 hr.

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(Oklahoma Air News continued)

THE North American Airlines, Inc., has been granted a state charter and will have its home office at Tulsa. It plans to establish a chain of privately owned airports in various parts of the country, which are to be connected by an airline. Virgie B. Moore, Tulsa flier and inventor, is head of the new organization and George Stephens, manager of the Tulsa Bureau of the Oklahoma State Chamber of Commerce, has resigned from that position to assume the assistant managership of the corporation.

THE D. H. O. Air Service Corporation of Tulsa has been named retail dealer for the Eaglerock in this territory, Bob Tarbutton, southwest distributor, has announced. Dean Davenport is head of this new company.

THE OKLAHOMA STATE AIRPORT PROGRAM

By Charles Hains Hopkins

A STATEWIDE program of airport development, involving an initial expenditure of more than two million dollars by thirty-six cities, has been inaugurated in Oklahoma as the result of a crusade in behalf of commercial aviation which began last May with the successful all-state goodwill air tour sponsored by the Chamber of Commerce of the State of Oklahoma, a service organization of local chambers of commerce in 241 Oklahoma cities and towns.

So great was the enthusiasm in the various cities following the tour that the Oklahoma state chamber was deluged with requests from member organizations to follow up its missionary work. The tour had demonstrated, above all else, the need for adequate area in the landing field of the future. As a result of the request for service on the part of member organizations, the state chamber crystallized favorable sentiment developed by the air tour into a comprehensive statewide plan. The program was set in motion under the direction of Ralph H. Berry of Tulsa, chairman of the state chamber's aviation committee, and W. B. Estes, general secretary.

With almost forty cities lined up for immediate development of airport projects, the Oklahoma organization was able to obtain the assignment of W. J. Mackenzie, airport engineer of the Bureau of Aeronautics, to inspect the sites. The tour of inspection began August 27, and has just been completed. Every one of the new Oklahoma airports has been rated Class 1 on size by the Department of Commerce. In many instances, dirt began to fly and hangars and repair shops had started skyward before the ink was dry on Mr. Mackenzie's report on that particular airport.

In all its relationships with member organizations, the Oklahoma state chamber has upheld the municipal port as the ideal set-up to insure future development of aviation in the state. With passenger and express lines in actual service, Oklahoma can vision the day when airlines will assume foremost importance as common carriers. However, control of airports by commercial companies for their own use would place a premium on private flying for business and profit, and Oklahoma cities are taking no chances on having to change that old expensive phrase "free air."

In listing the results of its coöperative campaign of 1928-1929, the Oklahoma state chamber has no thought of minimizing the efforts of communities that have established airports by private or semi-public subscription. Bartlesville, Okmulgee and Duncan are examples of Oklahoma cities that already have airports considered adequate for their needs.

On the other hand, many Oklahoma cities with established airports have realized the inadequacy of their set-ups even under present conditions. Oklahoma City and Ponca City were forced to jump in and prepare temporary municipal ports for the handling of air mail when the present N. A. T. Kansas City-Dallas line was routed through these two prosperous communities.

After watching five or six proposals for a municipal airport fail to materialize because of lack of coördination, Tulsa, oil capital of the world, is building a $300,000 400-acre airport north of the city, near Mohawk Park. All local factors contributing to the support of aviation in the oil capital are coöperating in the financing of the early development. Later the Chamber of Commerce and other agencies will submit a pro-

(Continued on next page)

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(*Continued from preceding page*)

posal to sell the airport to the city at cost as a municipal enterprise, provided this course is deemed advisable in light of future development.

Even the United States Army and the state of Oklahoma have shown remarkable willingness to assist in the airport-building program. At El Reno, the War Department has authorized the use of 640 acres of the Fort Reno military reservation as a landing field for a combination military-commercial field. Hangars and repair shops will be built on private property across the boundary line of the reservation, this improvement to be sponsored by the city of El Reno and the El Reno Chamber of Commerce.

At Vinita, much the same situation exists as at El Reno, except that there the available landing area is owned by the state as part of the grounds of the Northeast Oklahoma Hospital. The Vinita Chamber of Commerce is negotiating with the state for the use of the asylum grounds for a landing field, the hangars and permanent improvements to be constructed on other land across the imaginary boundary line from the state-owned tract.

Muskogee is the home of Hatbox Field, internationally known as one of the model airports on the Model Airway of the United States Army. Muskogee had a small commercial field when, seven years ago, it was intimated that the army could be induced to make Muskogee a port on its airway. Public-spirited citizens organized the Muskogee Aviation Club as a division of the Muskogee Chamber of Commerce, and this club financed the permanent possession of the old cow-pasture field and the installation of the hangars, wireless equipment and lighting devices furnished by the government. While the Muskogee field is under direct control of an air service commandant, it is open to commercial flying because of the city's participation in the building of the field. In order to obtain a rating of 1 on size, Hatbox Field will have to secure only a small tract of land adjoining the present field.

In summarizing the results of its airport program, the Oklahoma state chamber finds that nineteen cities have progressed to the point where permanent sites have been obtained, cost estimates worked out, and the method of financing determined. In fourteen of the cities, estimates of first cost are awaiting action of chamber of commerce committees charged with the securing of sites recommended by the federal airport specialist. In many cities, this cost will represent merely a nominal sum to be expended in obtaining more land, but pending determination of the financial consideration in each instance, final cost figures have not been announced. All of these fourteen cities, however, as well as the three that have deferred a definite plan until old fields and operating contracts are disposed of, have accepted the municipal airport theory and have endorsed a local development program.

The following list shows the location of Class 1 airport projects, the acreage involved in the ultimate development and the approximate ultimate investment:

Town	*Proposed Acreage*	*Proposed Investment*
Tulsa	400	$300,000
Muskogee	300	200,000
Woodward	320	75,000
Holdenville	240	65,000
McAlester	150	50,000
Pawhuska	240	50,000
Hobart	340	50,000
Clinton	400	50,000
Cushing	220	50,000
Ardmore	210	50,000
Cordell	360	50,000
Enid	400	50,000
Elk City	240	40,000
Bristow	160	30,000
Alva	320	30,000
Mangum	160	25,000
Chicasha	160	20,000
Marlow	80	15,000
Altus	160	5,000
Blackwell	160	Tentative
Guthrie	80	Tentative
Ponca City	320	Tentative
El Reno	640	Tentative
Wewoka	80	Tentative
Miami	300	Tentative
Oklahoma City	400	Tentative
Coalgate	Tentative	Tentative
Lawton	Tentative	Tentative
Hugo	320	Tentative
Durant	320	Tentative
Norman	170	Tentative
Stillwater	320	Tentative
Sapulpa	320	Tentative
Vinita	320	Tentative
Afton	320	Tentative
Claremore	320	Tentative

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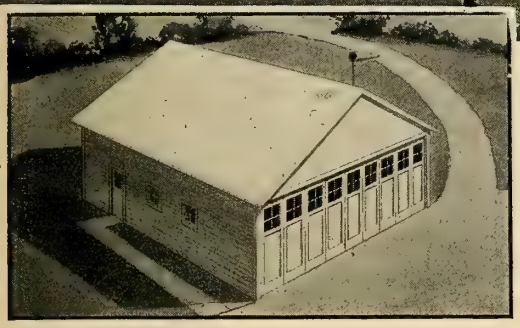
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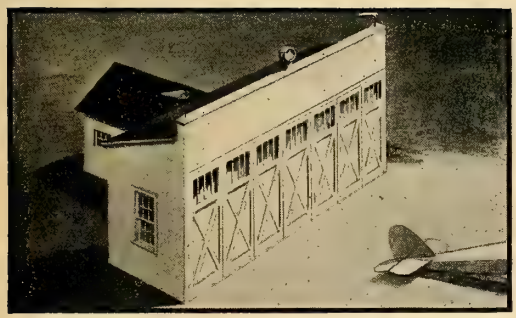
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The fact that this historical structure has withstood the ravages of the weather for so many years is a glowing tribute to the longevity of wood.

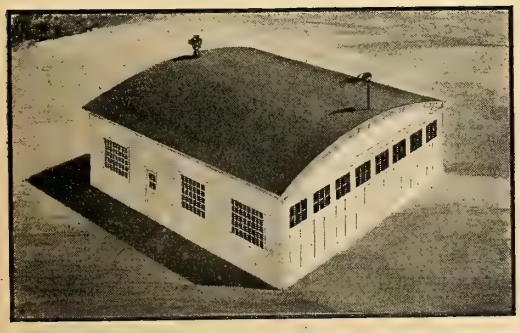


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WISCONSIN AIR NEWS

By William Scollard

FORTY-NINE planes took part in the dedication of the new airport at Wisconsin Rapids on October 20 and 21, while thousands of people visited the field to watch the planes engage in the various races sponsored by the Tri-City Airways, Inc.

In the Whirlwind cabin monoplane race, D. D. Griffin of Wausau in a Ryan won over the 20-mile course, covering the distance in 10 minutes and 12 seconds. In the event for open cockpit planes with a piston displacement of 810 cubic inches or less, John Wood, Wausau, in a Sport Waco won, covering the 20-mile course in 8 minutes 39 seconds. Fred Lund, Troy, Ohio, placed second and Art Davis, Lansing, Michigan, third. In the Whirlwind cabin monoplane race, Elwyn West, Appleton, placed second and Edgar LaParle, Milwaukee, third.

In the open cockpit event for planes with a displacement of 510 cubic inches or less, Vern Roberts of Olney, Ill., in a Monocoupe was first in 10 minutes 56 seconds for 20 miles. Wilford Gerbracht, Ames, Iowa, in a Travel Air, was second and D. D. Griffin, Wausau, in a Waco, third.

Vern Roberts of Olney, Ill., in his Monocoupe, with which he won the 510 open cockpit race, also copped the altitude event, climbing to 3,000 feet in 3 minutes 30 seconds. Wilford Gerbracht was second in his Travel Air, and H. A. Morey, Madison, third.

Ray Leavitz's flying circus and three army pursuit ships from Selfridge Field, Mich., gave exhibitions between events.

TED LEWIS, formerly of the Canadian Royal Flying Corps, has opened a flying school at Burlington.

W. L. JAMESON, former army flier at Brooks Field, Tex., has been added to the Madison Airport staff as special instructor.

Harry Hentschel of Travel Air, Inc., will remain in Madison to promote sales of planes in this vicinity.

WISCONSIN has 29 airports, three of which are completely equipped as far as lighting is concerned. Eleven ports are municipally owned, these being at Kenosha, Racine, Kohler, La Crosse, Menasha, Milwaukee, Neenah, Rhinelander, Superior, Wausau and Wisconsin Rapids.

Purely commercial fields in Wisconsin total eleven and are at Appleton, Fond du Lac, Green Bay, Janesville, Kilbourn, Madison, Milwaukee (2), Oshkosh, Sturgeon Bay, Superior, Waukesha and Watertown. Seven fields are listed as intermediate fields along airways, marked and lighted by the Department of Commerce. These are located at Columbus, Hager, Mauston, Oconomowoc, Portage, Somers and Sparta.

THE Watertown Aero Club has been incorporated at Watertown for the purpose of operating airplanes. Signers of the articles of incorporation are I. H. Schoenfeld, A. Bock and A. A. Ulluile.

THE Washington Island Airport Company has been incorporated at Madison. Officers of the company are George Mann, president; William Jess, secretary and treasurer, and Dr. Charles Colebaugh, vice president. Besides the officers, directors of the company are Thomas Goodman and Theodore Gudmundsen. The company has a 55-acre tract located in the north central part of the island and will give airplane service to the island from the mainland.

MINNESOTA AIR NEWS

CLARENCE L. WHEELER of Monroe has purchased an International Sportsman F-17, and will establish a flying field and operate a flying school in that city. Captain McKenna of Chicago will be instructor at the field. Mr. Wheeler has the agency for the planes of the International Aircraft Corporation of Cincinnati, Ohio, with a territory of twelve counties, including Dane, Wisconsin and Stephenson, Ill.

OTTO SCHEUERMANN, Milwaukee, has invented an instrument to aid in making airplane landings safe. The plan calls for an automatic turntable in the center of the field, which is flush with the ground and serves both as a wind direction indicator and as a landing signal. Four runways with automatic signals, which flash green at the best landing point and red at the farthest end of the runway, aid the flier in landing.

THE two airplane factories located in Minneapolis, the Mohawk Aircraft Corporation and the Waldron Aircraft and Mfg. Co., plan to increase their respective activities in 1929. The Waldron Company, which has been busy for several months in the development of a plane, is to begin commercial production soon, and the Mohawk Corporation expects to manufacture about 300 monoplanes next year. The latter company now employs about 25 persons in its plant.

WORK has been started on improving the St. Paul Municipal Airport, following the approval of a $15,577,000 bond issue by the citizens of the city for the purpose of public improvements. About $500,000 of this sum will be used for the airport.

MINNEAPOLIS has become the headquarters of a new aviation firm which will manufacture planes and conduct flying schools, through the purchase of Air Service, Inc., of Minneapolis, by Air Service, Inc., Wichita, Kan. The Minneapolis office will direct activities of the concern in Minnesota, Wisconsin, North and South Dakota, and Montana.

LOUIS PIPER, Minneapolis capitalist, has been elected president of the Universal Aviation Corporation, a $6,000,000 consolidation of nine established aviation companies which will operate in the west and mid-west. Headquarters for the concern will be Minneapolis, Chicago, and St. Louis. The firms included in the merger are Northern Air Lines, Universal Air Lines, Inc., Robertson Aircraft Corporation, Universal Airlines System Terminal Company, Mid-Plane Sales and Transit Company, Northrup Airplane Company, Air Transportation, Inc., Egyptian Airways, Inc., and Robertson Flying Schools, Inc.

THE first aviation business school in the United States was opened November 10 in St. Paul by the Universal Air Lines.

S. A. E. TO AWARD WRIGHT MEDAL

THE Society of Automotive Engineers, Inc., through its council, is offering the Wright Brothers Medal as an award for the paper of highest merit on aerodynamic or related subjects, which is presented at a meeting of the society or one of its sections during 1928. Papers are to judged primarily for their value as new contributions to existing knowledge of aeronautical science. Rules for the award of the medal may be obtained on request, addressing correspondence to Wright Brothers Medal Committee, Society of Automotive Engineers, Inc., 29 West 39th Street, New York City.

In 1924, the Dayton section of the society originated the idea of awarding the medal with the dual purpose of honoring the first successful builders of heavier-than-air craft and of stimulating further progress in aeronautcal design and theory.





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GUGGENHEIM CAMPAIGN FOR TOWN MARKINGS

BELIEVING that identification of localities is essential to a nation-wide air transport system, the Guggenheim Fund for the Promotion of Aeronautics has organized an extensive campaign to encourage the marking of roofs in all towns and cities with populations between 1,000 and 50,000. Through the postmasters of the various towns, the Fund is seeking to bring the matter before responsible individuals or civic organizations which will arrange for roof-markings. The Fund has already issued a bulletin describing the most suitable locations, sizes and colors for such markings.

DELAWARE AIR NEWS

THE Bellanca Aircraft Corporation of Wilmington, working under an arrangement by which its financial resources have been considerably increased, will enlarge its factory at New Castle. In addition to the present Bellanca model, new multimotored passenger transport planes will be manufactured.

Members of the Du Pont family, who originally owned a large interest in the Bellanca company, have disposed of their holdings to Mr. G. M. Bellanca, president, and a group of men interested in the refinancing of the corporation.

RADIO EQUIPMENT FOR NEW RIGID AIRSHIPS

IT has been decided to use the *Los Angeles* for an experimental ship from a radio standpoint in determining the proper design for the radio equipment with which the new ZR4 and ZR5 will be equipped.

With this in view steps are being taken to develop equipment which will replace that now installed on the *Los Angeles*. Both the intermediate frequency and high frequency sets will be replaced and the present wind-driven power source will be removed and engine driven power units substituted therefor. The present radio compass will be allowed to remain intact as it has given very satisfactory service, though it is possible that the receiving equipment for same may be replaced by some of more modern design.

It is the Department's desire that the new airships be equipped with apparatus which will have a communication range equal to their cruising radius which will exceed 8,000 miles. Experimental equipment will be built before starting construction on the sets to be installed on the ZR4 and 5.

The ships are to be powered with eight engines instead of five as in the case of the *Los Angeles* and the ignition systems of the engines will be shielded to improve radio reception on board.

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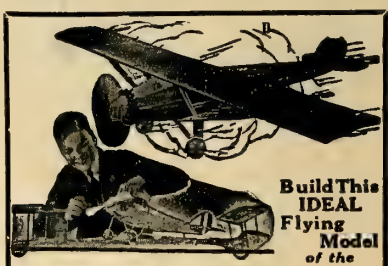
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Refractories-Floor and Stair Tiles

FOREIGN AERONAUTICAL NEWS IN BRIEF

Compiled from the foreign aeronautical press, the Automotive Division and the Transportation Division, Bureau of Foreign and Domestic Commerce

ITALY

GENERAL FRANCISCO DE PINEDO, Italy's long distance flier, has been named head of the Italian aeronautical general staff. Pinedo recently received the Distinguished Flying Cross from Ambassador Fletcher in recognition of his brilliant exploit in being the first man to reach the United States from the European Continent in a European flying machine.

MAJOR ARTURO FERRARIN, who with Captain del Prete flew across the South Atlantic from Italy to Brazil, has been promoted to Lieutenant Colonel and appointed as Premier Mussolini's "personal pilot-in-waiting."

Littorio Airport at Rome

IN a number of respects, Littorio airport at Rome, Italy, is one of the most unique in continental Europe. Perhaps its most distinctive feature is its two-story hangar accommodating 200 airplanes, the first, if not the only, one of its kind in the world. The upper level, accessible by means of a 200-foot concrete runway which is inclined from the ground to a wide platform above, is built in three main sections. The larger planes are housed above, and the smaller planes, on the lower level. The hangar's capacity of two hundred planes is indicative of its great size. In order to eliminate as much confusion as possible, the entrance to the ground floor of the hangar faces north and that to the second floor, west.

The general plan by which Littorio airport is operated is another of its distinctive features. The operating company has made a special effort to popularize the airport—and has succeeded admirably. On every week-end, approximately 6,000 persons seek recreation at Littorio. In addition to the usual airport facilities, this airport has an outdoor tea garden, an athletic field and a rather large concrete grandstand. Of course airplane sightseeing hops represent the most popular activity; there are usually more applicants for such flights than can be accommodated. But dancing and athletic games draw great crowds. The admission fee at the airport is quite low—only one lira (5 1/3 cents) per person.

A three-story airplane factory adjoins the hangar. A hotel, a small office building and a clubhouse are other buildings at the airport. Although intended for visiting aviators, the clubhouse now lodges Italian government aviation cadets.

The field itself covers more than a square mile on the Via Salaria, northeast of Rome. Its proximity to the city is a great advantage.

With some assistance from the government, the National Aeronautic Company, a private concern, planned and built Littorio Airport.

HOLLAND

Dutch Air Traffic

By G. E. Bakker

STATISTICS of traffic during the summer of 1928 on the lines between Holland and various European centers, operated by K. L. M. (Royal Dutch Air Lines) show a substantial increase over the former summer season. K. L. M. carried 11,900 passengers and transported 788,000 pounds of freight, 45,250 pounds of mail and 21,400 pounds of parcel post.

Moreover, 2,900 passengers, 161,500 pounds of freight, 24,870 pounds of mail and 11,000 pounds of parcel post have been transported through services operated by K. L. M. in conjunction with other traffic companies.

Dutch East Indies

THE Agricultural Syndicate of Java has started a series of experiments to determine the feasibility of dusting rubber trees, using sublimated sulphur as an insecticide. The Fokker plane used, provided with a special kind of duster, took loads varying from 650 to 1,100 pounds into the air and successfully dusted the trees at a height of some 35 feet.

Poison dusting by planes will also be inaugurated at one of the tobacco plantations in Sumatra.

BELGIUM

DURING the recent royal visit to the Belgium Congo Colony, the King and Queen of the Belgians saved themselves many days of uncomfortable journey in small river craft by traveling several thousands of miles by air. The planes, met at the disposal of the Royal Party, belonged to Sebena Company of Brussels, which operates the first airline established in Belgian Congo, running between Buma and Elisabethville.

This company will establish in 1930 a regular through service between Belgium and Belgian Congo with stops in France, Spain, Algeria, French West and Equatorial Africa. The time required for the journey will be one week, as compared with three weeks required by steamer. Trimotored 1,500 h.p. monoplanes, each with a span of over 90 feet and spacious cabin accommodations are being built by Sabca Works of Antwerp.

PORTUGAL

THREE officers of the Portuguese Army Air Service, Captain Ramos, Lieut. Viegas and Lieut. Esteves, flying two Vickers Valparaiso biplanes each powered with a Napier Lion engine, recently made a flight from Lisbon to Beira in Portuguese East Africa. The flight required 45 days.



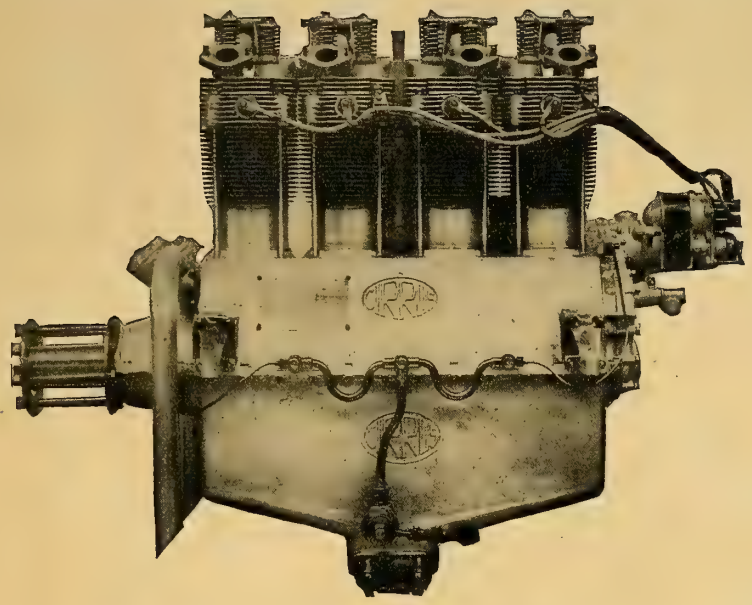
Courtesy of Portland Cement Assn

The Littorio airport at Rome is equipped with a two-story hangar accommodating 200 airplanes

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* World's Altitude Record for Light Plane, over 18,000 ft., Lady Heath, the pilot.
* 1st Prize The King's Cup Air Race 1926 } the most important aerial event
* 1st Prize The King's Cup Air Race 1927 } in the British Empire.

The American-built Cirrus (Mark III) 4 cylinder in-line engine of 95 h.p. fills a definite need in American aviation. Its simplicity and well established reliability and low head resistance make it the ideal power plant for training planes, 2 and 3 seater sporting and commercial planes.

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See Cirrus Engine on display at International Aeronautical Exposition at Chicago, December 1st to 9th, 1928.

FRANCE

THE French Government, having recognized the need for immediate changes from methods which have proved to be out of keeping with progressive development of commercial and military aviation, has established an Air Ministry under the leadership of M. Laurent Eynac. The new Ministry, which will have full control of expenditure, has outlined a program which comprises correlation between civil and military department, reorganization of commercial aviation, establishment in France of a number of landing fields and airports, improvement of international services, prolongation of airlines existing between France and its colonies in Northern Africa to Madegascar, Syria, Indo-China and Far East Colonies, establishment of transoceanic service between France and South America, efficient control of French aircraft industry, personnel and legislative matters.

Subsidies for 1929 are likely to amount to 1 billion 500 million francs. Air traffic companies will be enabled to carry through the extensions envisaged in the program by contracts, to be extended over a number of years, and by substantial subsidies.

The forty French firms specializing in aircraft manufacturing have been informed by the Ministry that such combination should forthwith be arrived at so as to reduce the number of manufacturing plants to 10 only, after which reorganization the industry will be subsidized.

For the present, record-breaking and transoceanic flights remain suspended.

Aerial Photograph Contest

AN international contest of aerial photographs taken in flight is being held in Paris under the auspices of the aeronautic industry. The date of the contest is set for July 31st of each year. As an exception, the closing date for the year 1928 is December 30, 1928. Accepted photographs will be placed on exhibition at the Society of Civil Engineers of France Building.

An International Jury of Honor will be made up of delegates from aeronautical groups. This jury will be presided over by a technician in aerial photography. The manager of the contest is Mr. Albert Payan, 47 rue Blanche, Paris. All shipments and communications relative to the contest should be addressed to him.

GERMANY

Graf Zeppelin Returns to Friedrichshafen

THE *Graf Zeppelin* landed at Friedrichshafen at 7:06 a. m. (1:06 a. m. Eastern Standard Time) on November 1, having completed the first round trip commercial transatlantic flight. The airship left Lakehurst, N. J., at 1:54 a. m. (Eastern Standard Time) October 29, on her return flight from the United States to Germany and covered the 4,500 miles in 71 hours, 12 minutes—faster than any previous transatlantic airship. The zeppelin arrived at 4:30 a. m. November 1 (10:30 p. m. Eastern Standard Time October 31) but was not landed on the ground for nearly three hours.



Statens Lufthavn, the airport of Copenhagen, Denmark

Dodging storms and fog, Dr. Eckener was forced to follow a zig zag course which was longer than his planned course. East of Newfoundland the dirigible headed into a violent gale which blew the ship off course and slowed her progress considerably. Again near the Bay of Biscay, storms and strong winds hindered her progress. The successful weathering of this unfavorable weather is a great tribute to the air-worthiness of the German dirigible.

Twenty-five passengers and thirty-nine members of the crew were on the *Graf Zeppelin's* homeward flight. Mrs. Clara D. Adams of Tannersville, Pa., was the only woman on board. There was one stowaway, Clarence Terhune. A total of 101,683 pieces of mail were carried on the flight.

FLYING a Junkers W33 monoplane with a Junkers L-5 engine, the Swedish pilot, Lindner, with Baron von Huenefeld as passenger, landed near Tokio on October 18. They had left Berlin for Tokio on September 18. The last leg of the flight, from Shanghai to Tokio, was made non-stop through a heavy rain and required about 17 hours' flying time.

SOUTH AMERICA

REGULAR fortnightly air mail and passenger service between Colombia and Ecuador was established by the "Scadta" Company during the summer. Every two weeks an all-metal hydro-airplane takes off from Barranquilla, Colombia, for Guayaquil, Ecuador. An overnight stop en route is made at Buenaventura. The plane remains at Guayaquil two days to enable those who receive air mail to answer by the return flight. Besides Buenaventura, intermediate stops are made at Cartagena, Sautatá, Quibdó, Istmina, Tumaco, Esmeraldas, Bahía de Caráquez, Manta and La Libertad. The flying time is between 30 and 35 hours. Letters addressed over this route from the United States require postage at the rate of 30 cents for each 20 grams (2-3 ounce) in air mail stamps, in addition to the national United States postage. The passenger rate between Buenaventura and Guayaquil is $200.

THE Curtiss Aeroplane Export Corporation, with the coöperation of the Department of Commerce, recently completed a number of sales transactions in South America for both military and commercial airplanes. The Government of Chile contracted for 18 observation and 9 pursuit planes. One Curtiss-Robin was sold in Santiago de Cuba, Chile, and another in Buenos Aires.

The admirable demonstration flights in South America conducted by Lieut. James H. Doolittle, C. W. Webster and William H. McMullen had much to do with procuring the sales. Lieutenant Doolittle recently returned to the United States to engage in fog research for the Guggenheim Fund for the Promotion of Aeronautics.

A BELLANCA cabin monoplane, which was recently purchased by a group of Peruvian citizens headed by Augusto B. Leguia, President of Peru, will soon make a flight from Lima to Washington, D. C. Stops en route will be made at Panama and Havana. Carlos Martinez de Pinillos will be pilot on the flight.

MEXICO

THE air mail route from Veracruz to Merida, Mexico, operated by the Compania Mexicana de Aviacion, an associated company of the Fairchild Aerial Surveys, Inc., of New York, was inaugurated on October 15. This service will enable the inhabitants of the states of Tabasco, Compeche and Yucatan to send mail to the Capital of the Republic in 24 hours. This trip heretofore has required 8 days.

Fairchild cabin monoplanes, powered by 425 h.p. Pratt and Whitney Wasp engines will be used exclusively on this mountainous route.

DENMARK

The Airport of Copenhagen

THE airport of Copenhagen, Statens Lufthavn, is located 5 miles southeast of the center of the city, and borders on the shore of the east coast of the Island of Amager. It is equipped with all the most modern features and accommodations. The wireless station at the airport can establish communications either with other ground stations or with airplanes in the air. Facilities for night flying include searchlights indicating wind direction and red border lights. Two large hangars, equipped with workshops and machine tools, have been constructed.

A hotel and a restaurant are maintained.



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CANADA

DURING the period from October 31 until the freeze up, mail planes of the Western Canada Airways, Ltd., have discontinued flying into the Rolling Portage—Red Lake district. After the freeze up, however, planes will fly to Red Lake from Sioux Lookout rather than from Rolling Portage.

Canadian Air News

By James Montagnes

OVER 200 delegates came to the conference sponsored by the London, Ont., Chamber of Commerce, for the discussion of quicker government action in the opening of new air mail routes and lighting the present air routes in Canada.

As a result of the conference a resolution was sent to Ottawa, asking for immediate opening of an air mail service from Toronto to Windsor, to pass through London. This service was inaugurated in September but has not yet functioned.

Airports for the 380 Canadian cities and towns, each of which should have its own airport, were advocated by several members of the conference. At present, it was stated, there are 44 licensed airports with 50 proposed ports, compared to 1,339 American airports in operation.

OSHAWA, Ont., is to get an airport, the Harding Aircraft Company having leased a site on which it will build a $5,000 hangar.

THE National Air Transport Company of Toronto began a daily passenger and express service on November 13th between Toronto and Windsor. Captain Earl Hand, president of the company and president of the Toronto Flying Club, piloted the first plane, which had a full load of passengers. Buhl cabin ships are being used on the service. A mail contract will also likely start soon between Toronto and Windsor.

Ontario Notes

By Eric McLeod Fowler

THE Ontario Government Air Service, which confines its operations almost wholly to forest-fire detection and protection, pays its pilots about $3,000 a year. Pilots are hired on a contract basis, being paid a $300 per month salary for seven months of the year. In addition there is a bonus of $2 for each hour's flying in the same period. In one season, a pilot can easily chalk up 400 or more hours' flying time.

An air engineer in the same service is paid for twelve months in a year at rates ranging from $185 to $200 per month. A flying time bonus of $1 an hour is also paid. During the winter months, the engineering staff is occupied with the annual overhauling of the machines and engines.

Canadian air mail pilots receive somewhat larger salaries, being paid $300 per months during the flying season, with a bonus of five cents per mile flown. Now that a daily air mail service has been established between Montreal and Toronto, it is possible for a pilot to earn $600 per month, in addition to living expenses.

Toronto Flying Club Meet

HAVING been postponed a week, the aerial field day of the Toronto Flying Club was run off November 10th at the club's field at Leaside, Toronto. Sixteen machines were on the field for the event, nine of them being DeHavilland Moths, the standard equipment for light plane clubs in Canada.

A high order of skill was shown in the keenly contested landing competitions. There were 26 entries in the three classes. Class One was for newly-graduated members of the club and was won by C. C. Bogart, 18 years of age, the youngest flier on the field. The class for those who flew solo prior to 1928 was led by C. W. McLeod, a war-time pilot.

The Moore and Curtis Trophy, open for competition to all pilots holding Canadian commercial licenses, was annexed by J. A. Parkinson, of the International Airways, Ltd., of Hamilton. Carter Guest, instructor of the club, was second.

The entry by the DeHavilland Aircraft of Canada, Ltd., was the new metal-fuselage Moth, with the Gipsy engine.

At the close of the afternoon, Carter Guest, and E. C. Burton, instructors of the club, and Leigh Capreol, put on a display of "balloon straffing".

(*Continued on next page*)



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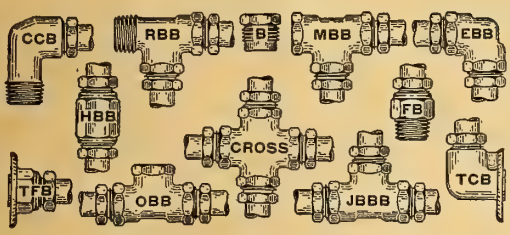
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(Canada News continued)

Vancouver Air News

By A. F. Roberts

CANADA'S first serious attempt at transcontinental flying ended successful in Vancouver recently, when Squadron Leader A. Earl Godfrey, M.C., A.F.C., and Sergeant-Major M. Graham of the Royal Canadian Air Force, Ottawa, completed a six-stop flight from the Dominion capital in their Fairchild Wasp all-purpose cabin seaplane. They carried the first Canadian transcontinental air mail, delivering a sack of 1,100 letters to Postmaster G. A. Clarke of Vancouver on their arrival.

Although the 3,200-mile flight occupied four days, it was made in the relatively good flying time of 32 hours. Leaving Ottawa on the morning of October 4, Godfrey and Graham flew by way of Long Lac, Lac du Bonnet, Winnipeg, Ladder Lake, Saskatchewan, Edmonton, Lake Wabamum, and Vancouver.

Godfrey declares that there is a natural airway for seaplanes stretching across Canada a little north of the thickly-settled areas. This route he followed, crossing the Rocky Mountains via Jasper National Park and Yellowhead Pass, where the C. N. R. line winds its way to the sea. He will make an exhaustive report to the Canadian government, and it is hoped that establishment of a Canadian transcontinental air mail service will follow.

Montreal Notes

By C. P. C. Downman

JUSTIFICATION for the air mail and passenger service between Montreal and New York, via Albany, which was inaugurated on October 1, has been found in an examination of carryings for the first month of operation, according to a report compiled by the Canadian Colonial Airways, Inc., and Canadian Colonial Airways, Limited, which maintain the two sections of the route.

A net profit of $3,000 is shown for the month of October, all costs, depreciation and insurance charges being covered. During the month there were 35 passengers carried, together with 10,885 pounds of mail, that represented about 34,200 pieces. A total of 21,877 miles was flown, and the gross receipts amounted to approximately $17,000.

It is expected that the air mail service will be continued throughout the winter, with machines equipped with ski-wheels. The landing carriage in contemplation has a pair of airplane skis, through which wheels protrude. When coming down on snow, it is thought that the skis will take up the plane's weight, while the wheels will support the machine when descending on land.

MORE than 6,000 flying hours without a single accident was the record of the Ontario Government Air Service for the past season. The flying cost was $75 an hour.

ENGLAND

LIEUT. D'ARCY GREIG, flying a Supermarine-Napier S-5 monoplane, exceeded world's speed records when he averaged 319.57 miles per hour at Southampton Water, November 4. His high speed, however, does not set an official record since he did surpass the previous record of 318.6 m.p.h., made by Major de Bernardi last March, by five miles per hour. Lieut. Greig made six flights over the course, four of which were used in compiling his remarkable average speed.

THE chairman of the Joint Committee and of the Society of British Aircraft Constructors, Ltd., has announced an aircraft exhibition will be held July 16th to 27th in the Olympia, London.

EGYPT

TOURISTS on the Thomas Cook Mediterranean cruise next January will have the privilege of flying from Cairo to Baghdad. In a single day the airplane will fly over this route, which formerly required two weeks of tedious travel by camel. The plane will make a short stop at the ancient city of Gaza and at Rutba Wells, an oasis in the Arabian desert. It will remain in Baghdad two days, before returning to Cairo.

CAIRO'S huge airport planned by the Government contains 2,100,000 square meters of landing area.

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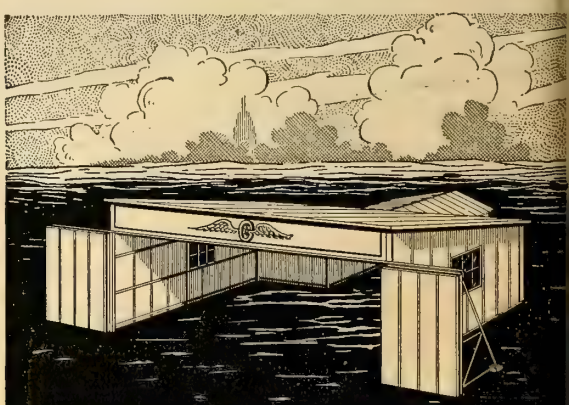
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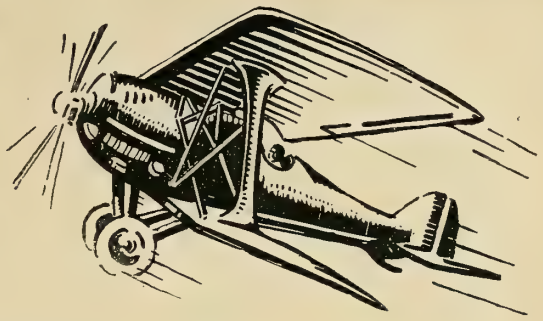


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Fin Area, 3½ sq. ft.
Rudder Area, 7½ sq. ft.
Length, overall, 24 ft.
Height, 7′ 8″
Weight, empty, 800 lbs.
Useful load, 475 lbs.
Full load, 1275 lbs.
Dihedral, 1½°
Load, lbs. per sq. ft., 6
Load, lbs. per H. P., 18

PERFORMANCE

Hgh Speed, 100 miles per hour
Cruising Speed, 85 " " "
Landing Speed, 35 " " "
Cruising Radius, 400 miles
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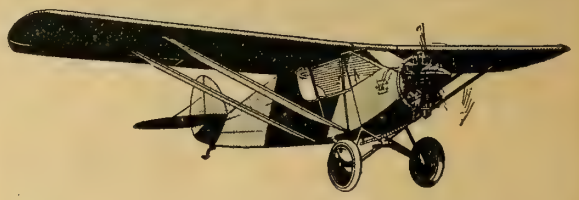
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O. H. Bruegger, Seattle, Washington, won the prize for December.

After the dedication exercises of the new Boeing Airport at Seattle last July, the ships partaking in it were put on display to the crowds. I was standing near a group of commercial ships—Waco, Travel Airs, etc. They were lined up and their numbers were shining in the sun.

Along comes Farmer Corntassel with the family. After gazing awhile he says, "Gosh, by the looks of those numbers on them planes I guess most of 'em are from North Caroliny."

Big Game

Not long ago a woman, who was on a shopping trip to New York by plane, hurried into a five and ten cent store and addressed the clerk as follows: "Give me one of these five cent mouse traps, please, and hurry up, I want to catch my plane."

—Mrs. George A. Kurtz.

The law of gravitation, Volstead and navigation were struggling nobly to regain their proper place in the person of a very, very tired birdman who was steering a somewhat irregular course homeward. (Three sheets to the wind and the stabilizer doin' tricks!)

Suddenly a huge form boomed up ahead of him. Bigger and bigger it grew as it advanced towards him.

"Hey—Hey! . . . hic . . . up 'air! hic! —could you tell me where I ish?" . . . hic . . . The form stopped. "I been waiting for the lord knows when . . ' hic . . . an I wants . . . hic . . . to know jes where I ish!" From the gigantic form hovering close by came a somewhat amused answer: "Why, yes, you're in Colfax!" "Oh! . . . hic . . . sh . . . scuse me, lady . . . I . . . hic . . . I thought dis wuz Lakehurst and de Graf Zepellin was comin' this way!"

—Earl L. DuRocher.

Prospective Buyer to High Pressure Salesman: "And how are these new fangled brakes that are on your planes?"

H. P. Salesman: "The new brakes are great, they will stop your plane on a dime and bring back eight cents change."

—Norman Belger.

Colored Man to Pilot: "Say, Boss, give me one of dem $3 hops."

Just before taking off the colored man signals to the pilot: "Roll her jes a little bit sos I can get dat drunkin sensation."

Pilot: "How much rolling do you want?"

Colored man: "Use yo own jedgement, you know $3 'ill buy a lot o' gin."

—Flora M. Rex.

She (to her boy friend on attending an air meet for the first time): "My goodness, look how that fellow is battered up! I wonder how it happened."

He: "Why he got that in a nose dive he was in the other day."

She: "Serves him right for attending such places."

—Morton Schwam.

Also, Slightly Annoying

The timid-looking little individual with the drooping wattles had been cautioned by the surly tempered pilot not to talk under any conditions. The take-off could have been better, and the flight a bit more refined, but the landing was the crown of aviatic achievements. The plane struck, rolled over on its port wing, smashed the prop and the chassis, and made kindling of the fuselage. After an ensuing silence the timid-looking little fellow stuck his wattles out from the wreckage, adjusted his round hat and eyed the pilot. Eventually he cleared his throat: "Ahem!—do you mind if I say something?", he peeped.

"Well—say it!"

"I like it all but the coming down . . . this way, it seems kind of expensive!"

—Walt House.

Speaking Plane-ly

Fast Male: "Isn't that a cunning young lady!"

Air Male: "Yes. She's an aviatrix and knows her aircraft. Be careful or she may land on you, next."

—Ashley N. Chandler.

Back Seat Snoring

After driving a car for years, Jones thought he'd try a plane and bought a two-seater. On his first trip aloft he bundled his wife in the back seat and all went well until he was forced to make a landing on a farm, and crashed. He lay stunned for a while and on recovering was asked what had caused the accident. Jones still somewhat dazed, shook his head and said, "My wife must have fallen asleep in the back seat."

—J. N. Lawrence.

Pilot (whose 'chute has failed to open) on the way down: Well, I'll never let that happen to me again!

—Clyde Kimball.

Pilot to negro attendant entering hangar: "Rastus how's that air?

Rastus: "Dat air what?"

—Ernest W. Tyler.

Professor of Aeronautics: "In class today we shall use the dihedral angle in our wing designing."

Bright student looking over his instruments: "Pardon me, sir, but I have no dihedral angle, all I have is a 45 degree and a 60 degree angle."

—Ralph M. Zink.

A letter recently received at the San Francisco traffic office of Boeing Air Transport complains that air mail is too slow, but reveals in the postscript a sound excuse for delay.

"Dear Sir:

I just want you should know what sort of a roten airplaine you got I sent a leter 2 weeks ago to my dotter was going to be marred to a man in St. Paul and I wrote her a leter and I went to the trubel and expence 5 cents to send this by airplaine because they said it would get there the day after, and it aint got there yet. Now I could make beter time with a hoarse in fact I have ofen done so. Now I aint going to holler but I want you should find whats holding this leter she thinks Im a liar

(Signed) .....

P. S. Since I wrote you this I have found my dotters leter in my blu pants."

—Oakland Airport Bulletin.

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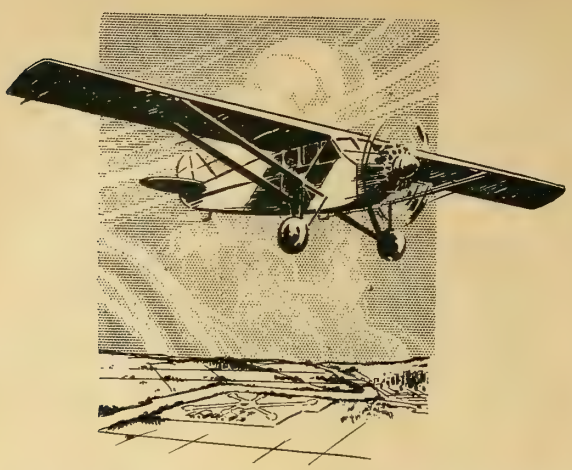
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MODERN SIGNIFICANCE OF WRIGHT PATENT

(Continued from page 1111)

ical interest, I should like to mention how cleverly the Wright brothers chose the place for their gliding experiments and how remarkably they interpreted the aerodynamical meaning of their short glides. It is also interesting to point out that they fully knew the essential laws governing soaring flight and in 1902 predicted the spectacular soaring flights of recent years—". . . if the operator had had sufficient skill to keep himself from passing beyond the rising current he would have been sustained indefinitely at a higher point than that from which he started."

I believe the success of the Wright brothers was due primarily to their determination and courage, mechanical ingenuity, uncanny test pilots' ability, scientific minds and foresight. Viewing the events of that pioneering period, not as a historian but as an engineer, I admire the inconceivable ability of these two men, untrained as they were in matters of science and engineering, to analyze and solve problems of the gravest importance, and furthermore their ability to anticipate in 1902 many of the principles and facts of aeronautical engineering and science of to-day.

AIR—HOT AND OTHERWISE

(Continued from page 1115)

William MacCracken will resign. But only the birds talked while we investigated this unpleasant gossip. Inquiries among the know-its failed to secure verification—and so we hope the birds are wrong as Washingtonian birds so often have been.

AERO DIGEST would be very much disturbed by the sight of Bill MacCracken moving back to wild Chicago. Chicago doesn't need him. Washington emphatically does. He has done far more for aviation, while he has been Assistant Secretary of Commerce in charge of aeronautics than anybody had the least right to expect he could. If the worst happens and he does resign, his sucessor will need to be an active, able, whole-souled, air-minded, competent, progressive super-somebody to maintain a stride one half as speedy as that which Bill has set.

Automatically, from time to time while writing about Bill, our typewriter has written him as Bill MacCrackerjack.

If he does resign, we shall mourn but shall not blame him, for we know that he patriotically has sacrificed a fine law practice to take the little salary he has been drawing. But, as a matter of fact, the salary has been the smallest part of that which he has earned and in fullest measure has been paid. His principal reward has been in the admiration, esteem and confidence, not only of his associates in Washington, but of the whole air industry.

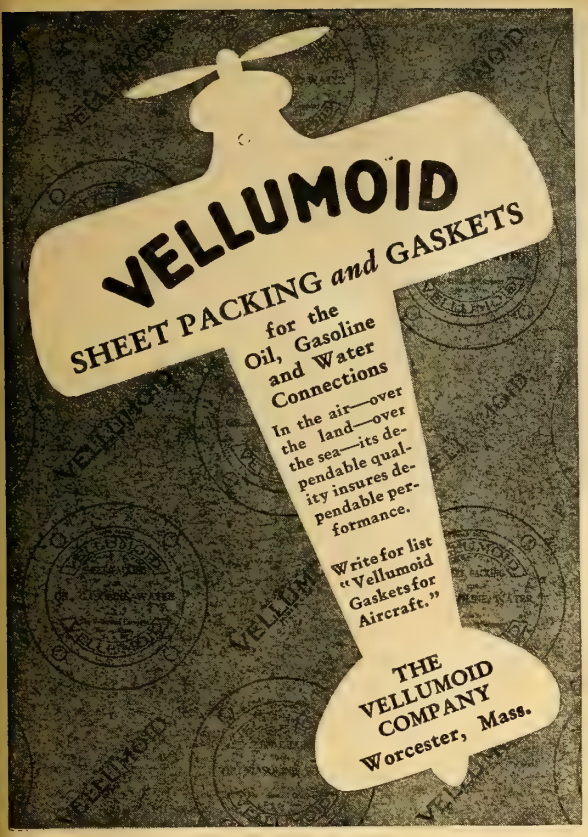
If the new powers that be have difficulty in finding a successor for MacCracken (and they will have a lot in getting anyone as good as he) they might do worse than to consider his present assistant—Major Clarence Young. He is airwise and progressive. He has a wonderful personality. It seems to many who have thought the matter out that he would fit into the job a little better than almost anybody else who could be found.

LOVE LETTERS OF A MAIL PILOT

(Continued from page 1134)

all right to an inspector and for all I know she's good for another hundred thousand miles, but I wouldn't want to impose on her good nature. You don't need to get scared for she ain't going to break anywheres. What she'll do is that some day she'll just get tired all over and separate.

(Continued on next page)



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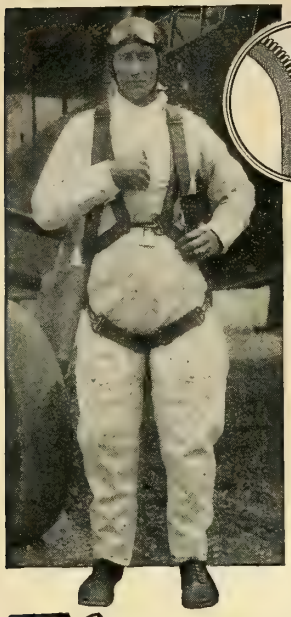
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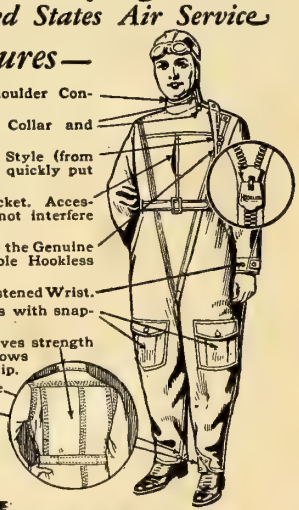
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(Continued from preceding page)

And then your Larrie Boy will have to walk home, and I don't know who's going to collect the mail from all over the eastern seaboard.

There's a breeze coming up which looks like it might take the blanket off Philadelphia and the neighboring vicinity, so I'll be getting along. I'm sending you a picture of the city hall they got here, which I picked up here in the waiting room. It's a little muddy, but so is everything else around here.

Hoping you are the same,

yours affectionately,

LARRIE.

Miss Mabel Kerrigan, November 25, 1928.
Richmond, Va.
Dear Mabel,

I see you had a party out at the house on Friday night, and the only thing I got to say is that you might of told me about it. I couldn't come, of course, for I gotta fly this mail, but it hurt me, it did, to go by late at night and see the place all lit up and cars parked all around, and me not knowing what was going on. I suppose Charlie Crowder was there. Pretty soft for those bum mechanics, what have got nothing better to do evenings but to go round after another fellow's girl, while he's on his way all alone to keep a date with the post office in New York at six o'clock in the morning. I suppose you didn't give me a thought either, and just danced around on the light fantastic and didn't care how I suffer.

Well, don't mind me. I can stand it, I reckon. Just because I love you and always did and always shall ain't no reason why you shouldn't get your pleasure out of life. I'm stuck here in Philadelphia now, and maybe you'll be sorry for me, but I ain't asking you to be. And if Charlie Crowder thinks he's a better man that I am, I'll be down to see him and he'll need at least a top overhaul before he'll be around to see you again.

Probably you won't be interested, but just the other night I blew off course down south, not through no fault of mine but because these weather bureau guys think they earn their keep if they send you word what the weather was likely to be the day before yesterday. So the first thing I knew there was a mountain in front of me, the biggest mountain I ever see, and how they moved it from the Rockies clear over into Virginia without nobody knowing about it is beyond me. And if it wasn't that I don't sleep much at the controls and can get action out of a ship which she don't know she has in her, I'd have bent my nose on that mountain and likely been reported missing in all the morning papers, with maybe my picture and the story of my life. And maybe while Charlie Crowder is shooting his applesauce into your shell-like ear (which is a line I got out of a magazine in Greensboro), you'll give a thought to the man that's got to fly the mail on the night shift, and I hope if don't make you feel too bad.

It looks like they are taking the shroud off Philadelphia even if it is Sunday, so I'll hook out of here. If I live through another week I'll be down to see you. But if you don't want to see me, you can leave a sign on the door. Things ain't hardly ever gone right for me anyhow.

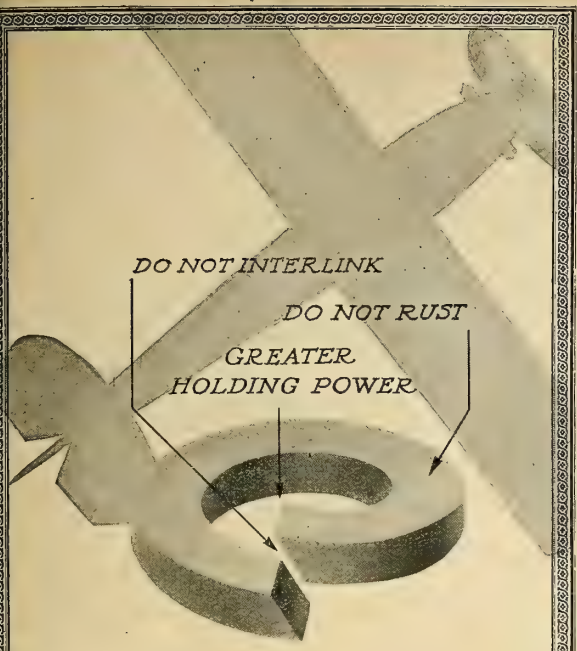
Your broken-hearted but devoted,

LARRIE.

Miss Gertrude Gamble, November 25, 1928.
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Maybe you'll be surprised to see I'm in Philadelphia,

(Continued on next page)



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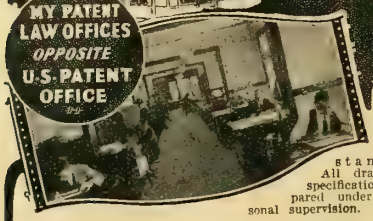
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(*Continued from preceding page*)

but you won't be any more surprised than I am, and I wouldn't be here except that I can't get out until the town digs itself out from under this here fog. So since I think of you pretty near all the time, I take pen in hand to drop you a line to say I love you as always and forever, which is something no other girl can say for herself, and I hope it pleases you.

It just comes to me that Christmas is coming, and I sure want to get you something nice and pretty. I don't just know yet what it will be, though I've got a pair of wings that I got from correspondence school when I was first learning to fly, and maybe you would like to wear them on your clothes some place, not just to hold them together but to show everybody that you're a pilot's sweetheart, in a manner of speaking. But I don't want you to get anything for me, or at least anything real expensive. I wear size 15 shirts and 11½ socks, and for sweaters and things my chest size is 42, but I wouldn't want you to think of getting me anything for Christmas unless you really feel you must.

I'm hoping the boss will slip me a raise along about Christmas for a little gift with the compliments of the season, and I don't hardly see how he can help it. With the exception of some of the mechanics up and down the line and a few of the pilots who can't help but be a little jealous, everybody says I'm the only real pilot on the route. It's a big responsibility to be that way, but it must be a big comfort to the Government to know that I'm here to get through with the mail even when it ain't possible. If you hear anybody down in Washington saying anything about my work, you might make a note of it and tell me. It's not that I care for praise, but when a guy's ambitious like me he wants to know that he's appreciated.

If the boss don't give me a raise, I hope he gives me a new ship. This one's all right when it's going downhill with a tail wind, but there's times when I can't push her over a hundred m.p.h., and I sure hate to pull in late at the fields along the line and disappoint the people who come out to see me. I've got my public and I can't go back on it.

Well, I thought you would like to know all the gossip along the line and if you think it's interesting you can show this letter to the neighbors. It's breaking away around the field now, and I think I'll swim out to the ship and buzz off.

Love and kisses from

LARRIE.

Miss Gladys Macdougal, November 25, 1928.
New York City.
Dear Gladys,

Honest, dearie, I'd have kept my date with you if I could. You don't figure for a minute that I'm here in Philadelphia because I like it, and I suppose you saw by the papers that the worst fog of the year came over here night before last, and I've been waiting ever since to get out. I'd have called you up, but they wanted to ask me sixty cents to call New York, and I suppose they figure that because I came from west of the Mississippi I'm a sucker. Remember the feller in the dizzy restaurant on 54th Street that thought that? Tried to charge me fourteen dollars for some ginger ale and ice and a sandwich. I paid him, but I guess he knows now that I'll never give him any more of my business.

But when a guy loves a girl the way I love you, he can't just sit here in Philadelphia without thinking a lot about you. So I'm writing this note to you, just to tell you that everything's all right and I hope you didn't feel too bad

(*Continued on next page*)

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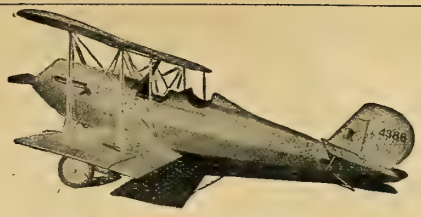
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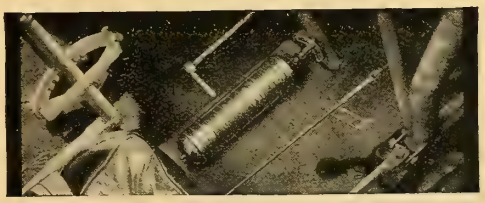
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(*Continued from preceding page*)

because I didn't show up at 42nd Street the way I said I would. I was going to take you to a show, too, and a swell supper afterwards, but maybe we can do that some other time.

The mail comes over here tonight on the train and I'm picking it up and going back south. It will be lonely there thinking of you. The trouble with me is that I'm a one-girl man. I've got your picture on my instrument board right next to the inclinometer, so that will show how much I think of you.

I'm afraid, though, I can't use the sofa-cushion you embroidered for me, not while I'm flying this mail. It's part of the rules that I got to wear a chute, and there's only one thing to do with a chute when you ain't exactly using it, and that is to sit on it. It sort of comes between me and your cushion, and then I'm sticking out so high from the cockpit it cuts my speed by about 10 m.p.h. So I'm leaving your cushion on my armchair in Atlanta, and everybody thinks it's real pretty. I've had a lot of fun kidding some of the girls—friends of the rest of the pilots and those bums of mechanics—who want to know where I got it. But I ain't telling them. That's just our little secret.

Well, I got to find a ham sandwich and a bucket of gas and get going. I hope you ain't lonely in New York without me. If you are you might look up my Aunt Emily, who lives somewhere down on West Nineteenth Street. You and she could have swell times together talking about me.

Lots of love from yours forever,

LARRIE.

THE WRIGHTS' FIRST FLIGHTS

(*Continued from page 1109*)

eleven Wilbur started on the second flight. The course of this flight was much like that of the first, very much up and down. The speed over the ground was somewhat faster than that of the first flight, due to the lesser wind. The duration of the flight was less than a second longer than the first, but the distance covered was about seventy-five feet greater.

"Twenty minutes later the third flight started. This one was steadier than the first one an hour before. I was proceeding along pretty well when a sudden gust from the right lifted the machine up twelve to fifteen feet and turned it up sidewise in an alarming manner. It began a lively sliding off to the left. I warped the wings to try to recover the lateral balance, and at the same time pointed the machine down to reach the ground as quickly as possible. The lateral control, was more effective than I had imagined, and before I reached the ground the right wing

(*Continued on next page*)

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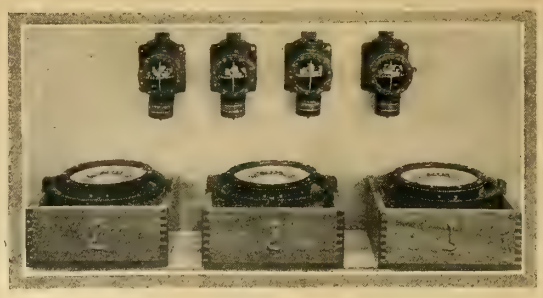
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(Continued from preceding page)

was lower than the left and struck first. The time of this flight was fifteen seconds and the distance over the ground was a little over two hundred feet.

"Wilbur started the fourth and last flight at just twelve o'clock. The first few hundred feet were up and down as before, but by the time three hundred feet had been covered, the machine was under much better control. The course for the next four or five hundred feet had but little undulation. However, when out about eight hundred feet the machine began pitching again, and in one of its starts downward struck the ground. The distance over the ground was measured and found to be 852 feet; the time of the flight, fifty-nine seconds. The frame supporting the front rudder was badly broken, but the main part of the machine was not injured at all."

It was estimated that the machine could be put in condition for flight again in a day or two, but while they were standing about discussing this last flight, a sudden strong gust of wind struck the machine and began to turn it over. Everybody made a rush for it. Wilbur, who was at one end, seized it in front, Mr. Daniels and Orville, who were behind, tried to stop it by holding to the rear uprights. All their efforts were vain. The machine rolled over and over. Daniels, who had retained his grip, was carried along with it, and was thrown about head over heels inside of the machine. Fortunately he was not seriously injured, though badly bruised in falling about against the motor, chain guides, etc. The ribs in the surfaces of the machine were broken, the motor injured and the chain guides badly bent, so that all possibility of further flights with it were at an end.

In the Spring of 1904 experiments were continued on what was known as Huffman Prairie, at Simms Station, eight miles east of Dayton. This second power-driven machine was stronger and heavier but similar to the first machine. When preparations had been completed for a public demonstration of the flying machine, a wind of only three or four miles was blowing—insufficient for starting on so short a track—but since many had come a long way to see the machine in action, an attempt was made. To add to the difficulty, the engine refused to work properly. The machine, after running the length of the track, slid off the end without rising into the air at all. The next day the engine again performed badly and after a glide of only 60 feet, the machine came to the ground. Further trials were postponed until the engine could be put in better running condition.

Before they had flown long in 1904, the Wrights realized that the problem of equilibrium had not as yet been entirely solved. Sometimes, in making a circle, the machine would turn over sidewise despite anything the operator could do, although, under the same conditions in ordinary straight flight, it could have been righted in an instant. The causes of these troubles were not entirely overcome till the end of September, 1905. The flights then rapidly increased in length, till experiments were discontinued after October 5, on account of the number of people attracted to the field.

The years 1906 and 1907 were spent in constructing new machines and in business negotiations. In May, 1908, experiments (discontinued in October, 1905), were resumed at Kill Devil Hill, North Carolina. Flights were made to test the ability of the machine to meet the requirements of a contract with the United States Government to furnish a flyer capable of carrying two men and sufficient fuel supplies for a flight of 125 miles, with a speed of 40 miles an hour. The machine used in these

(Continued on next page)

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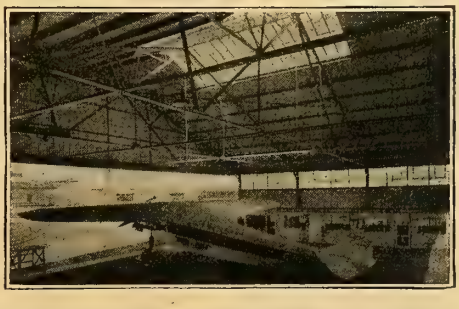
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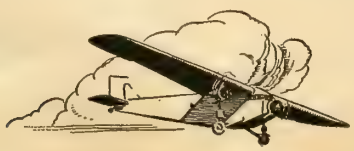
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(Continued from preceding page)

tests was the same one with which the flights were made at Simms Station in 1905, though several changes had been made to meet requirements. The operator assumed a sitting position, instead of lying prone, as in 1905, and a seat was added for a passenger. A large motor was installed, and radiators and gasoline reservoirs of larger capacity replaced those previously used. No attempt was made to make high or long flights.

AIRPORT AND AIRWAY NEWS

(Continued from page 1138)

a radio beacon system and telephone service from ground to aircraft. The required radio equipment on the airplanes is reduced to a short pole antenna and a simple receiving set weighing a few pounds, including a visual indicator which tells the pilot whether he is on the course or how far off. All of the expensive and powerful apparatus necessary for the system is on the ground, maintained by the Government.

"The radio beacons operate in the frequency band 285 to 315 kc. and the telephone stations in the band 315 to 350 kc. These are allocated to air service by the 1927 International Radio Convention. For the present, the beacons are adjusted to the frequency of 290 kc. and the telephone stations to 333 kc.

"The directive radio beacon is a special kind of radio station, usually located at an airport, just off the landing field. Instead of having a single antenna like an ordinary radio station, it has two loop antennas at an angle with each other. Each of these emits a set of waves which is directive, i.e., it is stronger in one direction than others. When an airplane flies along the line exactly equidistant from the two beams of radio waves, it receives signals of equal intensity from the two. If the airplane gets off this line, it receives a stronger signal from one or the other.

"The indicator connected to the receiving set on the airplane shows when the signals from the two beams are received with equal intensity, by means of two vibrating reeds which are tuned to different modulating frequencies used on the two antennas at the directive radio beacon station. When the beacon signal is received, the two reeds vibrate. The tips of these reeds are white on a dark background so that when vibrating they appear as a vertical white line. The reed on the pilot's right is tuned to a frequency of 65 cycles and the one on the left to 85 cycles. It is only necessary for the pilot to watch the two white lines produced by the vibrating reeds. If they are equal in length, he is on his correct course. If the one on his right becomes longer than the other, the airplane has drifted off the course to the right (into the region where there is more of the 65 cycles). If he drifts off the course to the left, the white line on the left becomes longer.

"Successful flights have been made up to 135 miles, in fog and over hazardous mountain terrain. This distance is more than enough to demonstrate the success of the system, as it is contemplated that the directive radio beacon stations will be placed not over 200 miles apart. Beacons placed at such distances, with a straight airway between them, will be supplemented by small marker beacons at intervals along the route. A characteristic signal from a marker beacon will show on the visual indicator aboard the airplanes what point is being flown over.

"The whole receiving system comprises a small indicator unit on the instrument board, weighing one pound, a receiving set weighing less than 15 pounds, and a 15-pound battery. The receiving system is very little affected by interference, including engine ignition interference, which

(Continued on next page)



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(Continued from preceding page)

has hitherto been the bar to satisfactory use of radio on airplanes."

The principal feature, from the operating standpoint, of the directional beacon is that a minimum of manipulation of equipment is required on the plane itself. It is far superior to the radio compass which requires that a loop be rotated until the point of minimum signal is observed. This operation requires some skill and observation of signal intensity variations as the loop is rotated, quite impractical under flight conditions. The directive beacon, on the other hand, works automatically. When there is ample personnel and space aboard a plane, it is quite possible that, ultimately, both the directive beacon and the radio compass may be used on planes which do not fly regular airways. The radio compass has the advantage that it can take bearings upon any radio station and determine the direction from which a signal comes; the directive beacon indicator functions only where a special guiding signal is laid down by a very highly developed type of radio transmitter. By taking observations on two or more radio stations, it is very easy to triangulate the ship's position on a chart with the aid of a radio compass.

A practical idea of the effectiveness of the radio beacon signal may be gathered from the results reported aboard the naval airship *Los Angeles* which has made use of the Hadley Field radio beacon on four occasions. It checked the beam carefully and reported that the signals were sharp and clear and the course easily followed. The beacon signal cuts straight across the hangars at Lakehurst, and the beam is about a half-mile wide there. On the state highway, at Hadley airport, about a half-mile from the transmitting beacon aerial, the point of equalized signal, indicating the exact course, is but ten feet wide. Although the experience with beacons is rather meagre, it is sufficient to warrant the conviction that all well-traveled airways will ultimately be navigated by means of directive radio beacons.

Another type of radio indicator which shows promise of greatly increased service value is the short range marker. This is a low power radio transmitter, automatically sending out a distinctive signal for a limited distance. It is quite possible to develop means of giving a visual signal to indicate the proximity of each marker beacon in the same way that the directive beacon indicator functions. This will obviate the necessity of manipulating a receiving set and listening for marker beacon signals.

With the growing complexity of auxiliary services and equipment contributing to the safety of life in the air and necessary to the simplification of navigation along airways, means of maintaining the required equipment must be discovered. In this connection, Martin Dodge, in his address on commercial airports before the National Association of Commercial Organization Secretaries at Nashville, recently presented some valuable suggestions to the managements of airports. After discussing the size, equipment and accessibility of airports, and the question of private versus municipal ownership, he summarized the sources of income for an airport as follows:

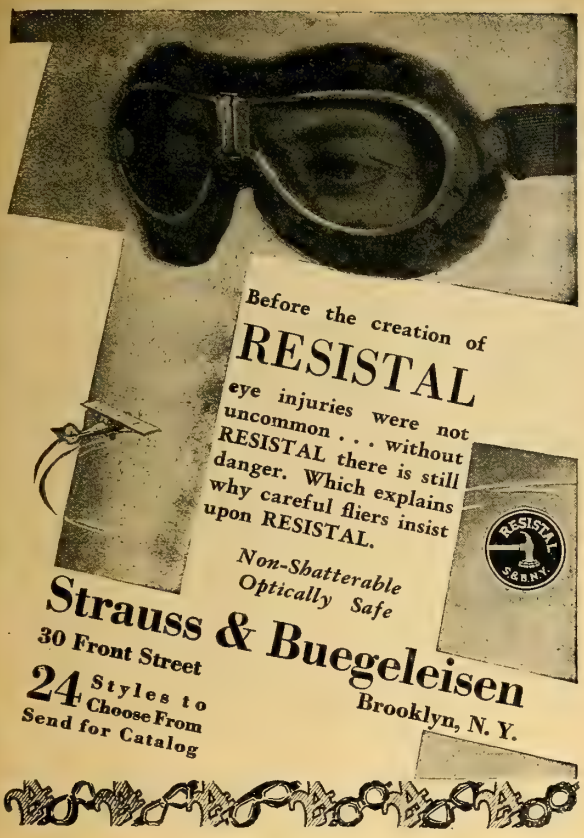
Leases of land with privileges of the field to aircraft and other manufacturers to whom location on the airport is advantageous.

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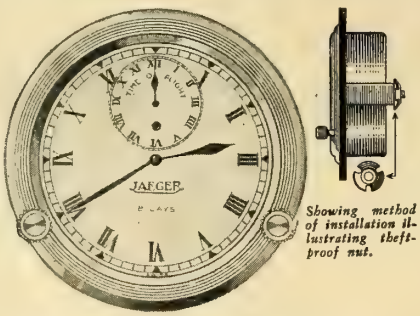
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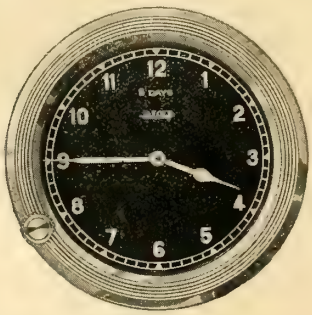


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Unquestionably, many opportunities are being overlooked by airport managements for the development of maximum revenue with which to maintain and expand their facilities. With increased responsibility, no means of increasing revenue should be overlooked by airport managements. The economics of airport management is fully as important as its technical aspects, for only if we work upon a sound economic foundation, can we look for the proper development of our airports. At this time, we are in an era of intensive and enthusiastic development, and municipalities are inclined to make generous appropriations for airport development, regardless of their ultimate economic prospects. There is no good reason, however, why airports should not be profitable, and healthy development is encouraged by taking advantage of every possible method of securing legitimate revenue. The subject of airport administration, from the financial standpoint, is worthy of the closest study.

The Department of Commerce has done notable work not only in developing radio equipment, but also in installing and operating it along the principal airways. Last April contracts covering radio equipment for twelve radio control stations, six radio beacons and twelve marker beacons were made with the General Electric Company and the Westinghouse Electric & Manufacturing Company. The Guggenheim Fund is installing a complete aeronautical weather reporting service on the Los Angeles-San Francisco airway, in coöperation with the Department of Commerce. Twenty-two weather observation stations in this territory will report to the terminal radio station by telephone and radio so that flight conditions may be forecast and aviators advised which of five alternate routes may be followed between the two cities.

The Army Air Corps is installing beacons at Mitchel Field, San Francisco, San Antonio, Uniontown, Pa., Cleveland, Ohio, and Washington, D. C. The range of these beacons varies between one hundred to nearly two thousand miles according to radio conditions. A two thousand watt radio transmitter, one of twelve provided for under contract, is about ready to go into service at Cleveland, Ohio, and it will not be long before all twelve are in active operation. At the same time, five hundred watt, high frequency transmitters are due to be in operation, forming a complete radio telegraph network between Dallas and Chicago. The intermediate points, at which these transmitters will be in operation, are Fort Worth, Oklahoma City, Wichita, Kansas City, Unionville and Moline. I give this meagre outline of actual practical work toward the establishment of airway radio communication as evidence that the ground equipment for adequate radio navigation is rapidly being installed. We are far beyond the speculation stage.

(*Continued on next page*)

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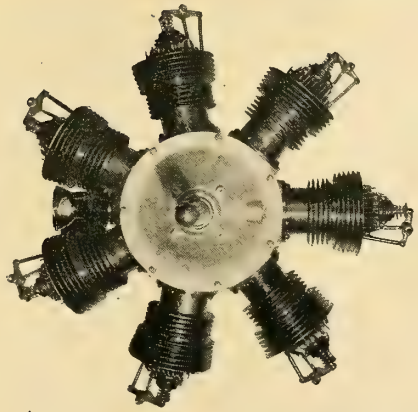
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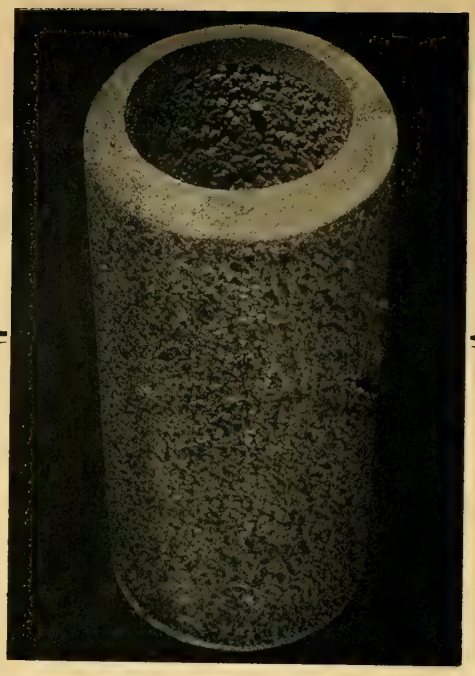


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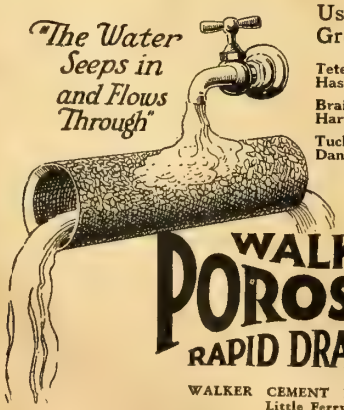
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(Continued from preceding page)

This communication network, which will be rapidly extended by the addition of fifteen new radio telegraph stations at strategic points, has recently been placed upon a new basis for the dissemination of weather information by the Airways Division of the Department of Commerce, working in coöperation with the Weather Bureau. An automatic printer telegraph system, operating over leased American Telephone and Telegraph Company wires, links these airport communication centers for the distribution of weather information gathered each three hours. Hourly reports of weather and landing field conditions are broadcast. The airplanes of the National Air Transport, flying mail between New York and Chicago, have been equipped with radio receivers and thus continued up-to-the-minute weather information will guard the safety of the pilot and plane in flight. Heretofore, weather reports have been furnished pilots before taking off, with the result that the bulk of his information proves unreliable thirty minutes after taking off, due to rapidly changing weather conditions, particularly when they concern points three or four hundred miles distant.

It has long been apparent that radio communication has been the missing link to the distribution of reliable weather information and that the operation of large passenger planes makes a more effective weather information and associated distribution system imperative. The first application of the new system has already been inaugurated between New York and Chicago, and it will be rapidly extended to other airways as the new 2,000 watt radio telephone transmitters go into operation.

The public, unacquainted with the multitudinous duties of the pilot in flight, has often been inclined to criticise failure to install radio equipment on the earlier long distance transoceanic flights. In support of this criticism is the effective work accomplished by radio in the instances that it has been used, such as in the several transatlantic airship flights, the flight of the *Southern Cross* from our west coast to Australia and the several transatlantic flights in which radio was used to give the public hourly or frequent bulletins of progress. The services of radio in effecting rescues and its aid by giving weather information and bearings have practically overcome what prejudice remains against carrying radio equipment.

Oldtime wireless operators remember the opposition which radio faced in its early days from the captains of steamships, accustomed to find their way without radio communication. A few notable rescues, such as that made possible by Jack Binn's famous CQD aboard the *Republic* (that signal being the predecessor of the now universally used S O S), and later the rescue of a part of the passengers and crew of the *Titanic* did more than all the argument in the world to sell radio in the field of ocean transport. In a like manner, the recent achievements of radio communication on long distance flights have undoubtedly done more to sell its usefulness for short distance commercial airway flying than all the logic which has been previously applied to the question.

The popularization of radio as an adjunct to aerial navigation is much stimulated by the development of the simplified reed indicator, which has already been described, because it requires practically no attention on the part of the pilot while in flight. We still have, however, a long way to go before every plane is equipped with radio and every widely used airway marked with radio beacon signals. It will be a service to aviation if the results obtained with radio and the technical progress achieved are

(Continued on next page)

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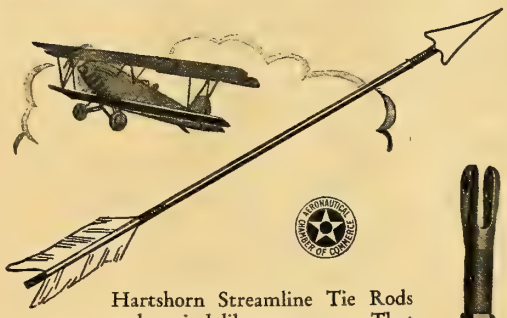
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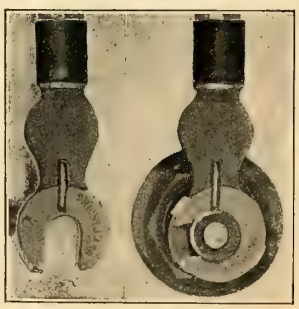


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(Continued from preceding page)

chronicled with greater emphasis in the journals of the aircraft industry.

In a like manner, airport development is becoming a specialized science which will contribute its part to estalishing commercial aviation as an integral part of the daily life of commerce. Airport maintenance involves machinery of many different kinds, and its wider use will contribute significantly to good landings. Lighting equipment for airports is a specialized science, undergoing rapid development. We may look forward to public address equipment which will enable persons on the ground to speak through immense loud speakers to aviators approaching, when they are as far distant as a mile from the airport. To date, the only important installation of loud speaker equipment is at the San Diego airport but, when the usefulness of the public address system is fully demonstrated, it will undoubtedly become a part of every principal airport.

I have only indicated, in a most general way, the growing services which will soon back up the pilot in his daily work. They represent opportunities for many different kinds of specialists who will become an integral part of the personnel of the aviation industry. In short, the air having been conquered by developing skilful pilots and equipping them with ships and motors capable of meeting almost any conditions, the time has arrived for the airport and airway to convert the hard won victories of science and courage into practical everyday commercial achievements. The American public has become air-minded, and it depends much upon these associated developments to make them universal air users.

THE YOUNG MAN OF EUROPE

(Continued from page 1121)

that Luft Hansa was inaugurating, in two years' time, a regular passenger service from Berlin, via Moscow and an undetermined Siberian station, to Pekin. Flying time—two full days, as against the six weeks by boat to the Far East and the fifteen days by the International Express, Trans-Siberian. It has not gone into effect yet, but it is well on its way since the preliminary flight of Risticz and Zimmerman.

Alors, as we Greeks say, what then?

Then we have the delicate position that the port of Liverpool finds itself in at present. Liverpool, having long believed itself a prominent seaport, approached Imperial Airways (British, naturally) to open a Liverpool-Ireland service and was met with the answer that, whereas the spirit was willing, a lack of suitable machines (the Short Calcutta type being destined for the Indian service) precluded the possibility. So Liverpool turned to Germany and the English newspapers yowled. Nevertheless, Mr. Matthew Anderson of the Liverpool Organization had the last word: "We have one aerodrome, but it is possible that we may shortly have one still more convenient. As soon as we obtain the new landing ground and can offer a two years' contract, the scheme will go forward. We would have liked a British company to carry on the service, but—" and so Germany gets the job.

Again. Mr. Lars Brundahl is at present negotiating with the Australian Prime Minister to sanction and possibly subsidize a Dornier Wal service from New South Wales to New Zealand and from the mainland of Australia to Tasmania, and an option has already been obtained on the services of Bert Hinkler and Mr. Parer as pilots. The machines are to be fitted, according to the preliminary statements, with Bristol British Jupiter engines

(Continued on next page)



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(*Continued from preceding page*)

(a concession to feeling?) and will carry twenty-five passengers and mails. The proposed capital will be 1,250,000 dollars, and the main support of the stock issue is expected from the German Dornier Company.

Coming back to Europe—one word more. Start from any given point in England, France, Italy and the Middle East—start on any given itinerary you care to—fly—and I will give you two to one that within four hundred miles you will have changed to a German plane. Further—I will give you even money that within six hundred you will have changed.

I speak of necessity, not choice. The fact is that the British, French and Italian lines are only feeders to the great network of the German service. And the fact further is that England and France have caused this to be.

I don't deplore it in the very least. The German service is excellent. I have nothing to say about it but praise. It is simply there—take it or walk.

The lesson?—there must be one this time. And there is. The country that flies is the country that is safe to-day. The country that flies itself, through any motive whatsoever, is the country that flies itself into the greatest safety.

I know that all wars are ended for all time, and I know that the world has been made safe for what have you and that a battleship can sink an airplane and listerine is good for dandruff, but what I can't get out of my head is this—if it takes sixty-two yards of duck to make an elephant a shirt waist, why won't a horse eat canned lobster?

Seriously—half the countries of the world are riding for a fall against the other half. Don't believe me for a moment and you won't offend me, because nobody offended Kitchener or Roosevelt, and who am I, with my bad eyes, to be blown up or die of a broken heart? But believe this, for you can see it. The airplane may not be any good without infantry to protect the ground officers, and the seaplane may not be any good without a fleet to base it on—but, strangely enough, everybody over here is as worried as the one-armed paper hanger when anybody else builds something that flies better or more hours or faster than the thing they have.

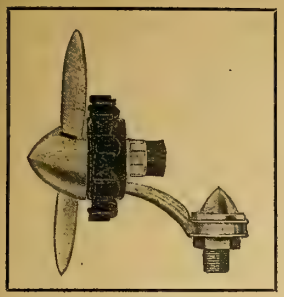
And why? Because everybody is building airplanes—everybody is going to use airplanes when the lid pops off the next time. And because there is *going* to be a next time when the lid *does* pop off, that country that knows more about the air, from having been in it most, is going to be safer than the rest and is going to come out with less men "sleeping in burnt cockpits the farthest out from their aerodromes."

That country is Germany to-day. But don't polish up your bayonets and don't bring out your medals yet, for there is a rider. Germany has no military air force, and whereas her passenger liners can easily be mounted with Spandaus and converted to long distance bombers, she must have scouts to balance the scale—hence her only air domination of Europe to-day is the domination of the mark versus the franc, shilling and lire.

No great war will be fought again for thirty years—but when it is fought the air services of the world may not win it entirely, but a lack of an air service will lose it irrevocably. Germany knows this. France knows it. England knows it. Italy knows it. But what they have all awakened to, since the Locarno Pact, is the fact that flying in peace time subtends flying in war.

America has awakened to it too. Let us hope that she keeps on awakening. Let us not only hope but—

Let us pray!



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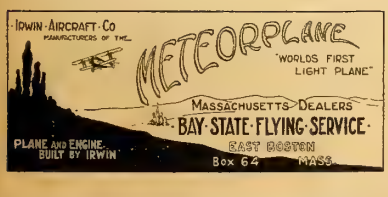
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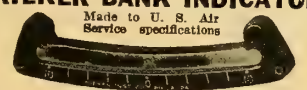
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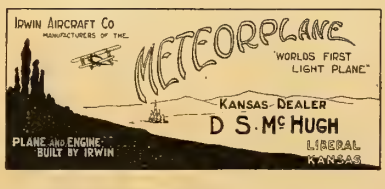
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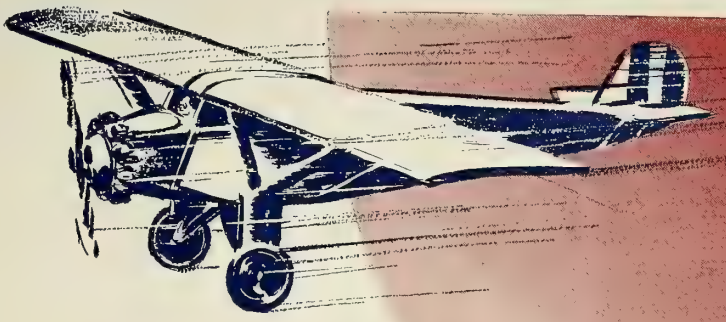
Walker Cement Products, Inc. 1300
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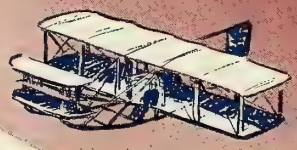


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THIS month marks the twenty-fifth anniversary of man's first successful flight in a self-propelled heavier-than-air machine. On December 17, 1903, at Kitty Hawk, N. C., Orville and Wilbur Wright proved to an incredulous world that their awkward box kite could rise from the ground and fly through the air under its own power, carrying a pilot.

That epochal event opened up a new field for automotive engines, in which correct lubrication was of vital importance. Early aviators found that the best results were obtained with an oil which was even then used everywhere in automobile engines—Gargoyle Mobiloil. Mobiloil's dependable quality and widespread distribution proved doubly attractive to those first hardy pilots whose crude planes were apt to need refuelling in out-of-the-way places.

From the earliest years Gargoyle Mobiloil has played an outstanding part in the thrilling pageant of events that have made up aviation history. Here are a few of the famous flights made with Mobiloil:

The Wright Brothers' early flights.

Glenn Curtiss' famous non-stop flight from Albany to New York in 1910, and other flights.

The U. S. Army aviators during the War.

Lieut. Maughan's first dawn-to-dusk flight across the United States.

The U. S. Army fliers round-the-world flight.

Commander Byrd's flight to the North Pole.

Art Goebel's Dole Prize flight from San Francisco to Honolulu.

Colonel Lindbergh's flight from New York to Paris, and his good-will trip to Mexico, Central America and the West Indies.

Amelia Earhart's spectacular flight across the Atlantic.

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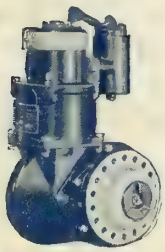
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ECLIPSE produces starting equipment adapted to the particular requirements of every size of modern American-made aviation engines . . . starters that insure safe, dependable, one-man starting even under the most unfavorable conditions. Twelve years experience in the design, development and production of aviation engine starters, together with a co-operative technical service, is yours to command at all times.

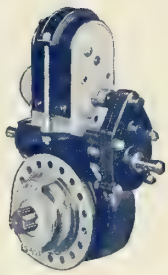
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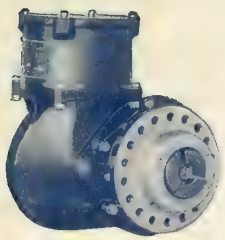
Eclipse Series 16 Hand Inertia Starter, arranged for cockpit cranking; particularly adapted for radial engines up to 1000 cubic inches.



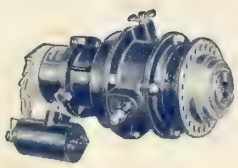
Eclipse Series 7 Combination Hand and Electric Inertia Starter. Vertical type adapted for V-type or radial engines up to 2500 cubic inches.



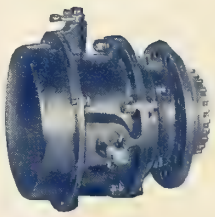
Eclipse Aviation Hand Starter with Booster Magneto Integrally mounted. Hand-turning gear 6:1 Reduction for Engines up to 900 cubic inches; 12:1 Reduction for Engines up to 1400 cubic inches; 18:1 Reduction for Engines up to 2000 cubic inches



Eclipse Series 7 Hand Inertia Starter. Vertical type, adapted for V-type or radial engines up to 2500 cubic inches.



Eclipse Series 6 Combination Hand and Electric Inertia Starter for radial engines up to 1350 cubic inches; Series 11 Combination Hand and Electric Inertia Starter for radial engines up to 2500 cubic inches. Concentric type with magnetic switch.



Eclipse Series 6 Hand Inertia Starter. Concentric type, particularly, adapted for radial engines up to 1350 cubic inches. Series 11 Hand Inertia Starter for radial engines up to 2500 cubic inches.



Eclipse Aviation Generators, 15 Volt, 15 Ampere capacity and 15 Volt, 25 Ampere Capacity, voltage regulated, Engine driven type.

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